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CONTENTS

	PAGE
Editorials	1005
Letters to the Editor	1010
Publications Received	1011
The Scrap Heap	1012
Overseas Railway Affairs	1013
The Evolution of Railways—III	1015
The Coronation Scot, L.M.S.R.	1019
Railway News Section	1031

ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with each copy of this week's issue.

The International Railway Congress

WHEN the Eleventh International Railway Congress was in session at Madrid in 1930 it was considered that five-yearly meetings were not enough. The next congress, at Cairo, therefore, took place in 1933; but such are the vagaries of the trade cycle that, whereas 1930 occurred at a peak, accompanied by the optimism of a little relative prosperity, 1933 was in the very slough of despond, and 1937 was considered soon enough for the next congress. The trade cycle is not a proper cycle: its wheels are not round, and there is no knowing when the next bump will occur, or how severe it will be. It is certain, however, that the Thirteenth Session of the Congress, which is due to open in Paris on Monday, has all the appearance of better luck than the twelfth, for it is timed to take place well up the slope of the trough; though how far remains for the future to disclose. Another thing is certain, and that is the steady development of man's mastery over nature, so that now, in reality, there is no justification for any trade cycle at all: there should be, instead, uninterrupted progress in the beneficent work of the engineer in "directing the great sources of power in Nature for the use and convenience of man." The Paris Congress is to consider many problems, in the working out of all of which, however, the trade cycle is likely to play its usual erratic part. The trade cycle remains the great—unnatural—force which man has not yet tried to direct for his own use and convenience.

M. Raoul Dautry

One of the most remarkable events in railway history has been the rehabilitation of the French State Railways by M. Raoul Dautry, who, as announced last week, is shortly to retire. Appointed General Manager towards the end of 1928 (see our biographical notice on page 1031), M. Dautry, with the characteristic energy those who had watched his work on the Nord knew, set to work with such good effect that only four years later we were able to place before our readers, in THE RAILWAY GAZETTE of January 6, 1933, a description of accomplishment that must be nearly if not quite unique in the annals of railways. For the 20 years before M. Dautry's appointment, the French State Railways had been directed by no fewer than eight different General Managers, and there had been 22 Ministers of Public Works in whose sphere of authority the administration of the State Railways lay. Naturally impaired by such conditions, the equipment and services of the railways were at a low ebb of efficiency. Within four years, as our article showed, all this had been changed. The State Railways, almost a by-word so little while before, then formed one of the pleasantest and most reliable transport organisations to be found anywhere. M. Dautry's influence was apparent both in the demeanour of the staff, among whom the judicious delegation of authority coupled with sympathetic consideration had induced a new self respect and *esprit de corps*, and in the high standard of the transport services. Modernisation has been the keynote of M. Dautry's work, and the efficient transport structure he had created after his first four years of office has been the subject of continuous improvement ever since. That process of progressive change has culminated only a short time before his retirement in the opening last Saturday of the Paris—Le Mans main-line electrification.

* * *

The Week's Traffics

Last week's traffic returns include the figures for the Sunday and Monday in Whitsun week on the L.N.E.R. and for the Monday on the three other main line railways, and compare with an ordinary week in 1936, so that passenger train receipts are substantially up, and merchandise and coal earnings are generally down. Comparing the Whitsuntide holiday fortnight of 1937 with that of 1936 it will be found that L.M.S.R. 1937 Whitsuntide traffics increased by £94,000, L.N.E.R. by £104,000, Great Western by £29,000, and Southern by £73,000. Passenger train traffics of the four companies improved by £199,000 and coal receipts by £170,000, but merchandise shows a net decrease of £69,000.

	20th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R. ..	+128,000	- 54,000	+ 5,000	+ 79,000	+1,025,000	+4.48
L.N.E.R. ..	+ 80,000	- 24,000	- 3,000	+ 53,000	+ 741,000	+4.41
G.W.R. ..	+ 42,000	- 30,000	- 27,000	+ 15,000	+ 452,000	+4.84
S.R. ..	+ 94,000	- 12,500	- 1,500	+ 80,000	+ 330,000	+4.63

London Transport receipts for the past week were £453,500, a reduction of £116,000 in comparison with the corresponding week of 1936.

* * *

Railway Rate Cutting

With the topical interest aroused in passenger railway fares at the moment may come some reflections on conditions in the old days when there was keen and not infrequently ruinous rate competition between railways. Originally it was the iron horse against other forms of transport, as when the Great Northern Railway, which always excelled in pugnacity of this description, in 1848 extinguished the competition of the steam packets on the Witham Navigation by introducing a fourth class at $\frac{1}{2}$ d.

a mile on the Boston to Lincoln line. Fourth class travel at extremely low fares could be enjoyed on the Edinburgh & Glasgow Railway in 1845 and on the Eastern Counties & Norfolk Railway in 1853. The Great Exhibition year of 1851 saw some particularly fierce competition between the Great Northern, and the Midland and London & North Western Railways for the heavy Yorkshire—London excursion traffic. The antagonism between these railways had somewhat abated on the proposal to submit to the Right Hon. W. E. Gladstone as arbitrator a scheme to pool the traffic receipts between competitive points. Then the competition of very cheap sea fares from Hull to London was met by an unauthorised rail reduction by a local agent; this was all that was needed to stir up redoubled rivalry, and rail fares were cut until the return fare from the West Riding to London fell to fifteen, then to ten, and finally to five shillings. It might have fallen further had not the Great Northern declared that whatever fare its competitors charged it would charge sixpence less! The following five years saw equally low excursion fares in operation and Mr. Denison, M.P., Chairman of the Great Northern, said he was expecting all his West Riding constituents "washed and unwashed" to visit London. The entry of the Great Northern into the London—Manchester field and the inevitable rate war enabled the return journey between these towns to be made in 1858 for five shillings. The excursionist of those days could indeed count himself as a lucky dog!

New South Wales Railways Quarterly Report

The New South Wales Government Railways report for the quarter ended December 31, 1936, shows an increase in earnings of £221,634 and in expenditure of £42,133, as compared with the corresponding quarter in 1935. The number of passengers carried rose by nearly 2,000,000, and the train mileage by over 300,000. Coaching earnings were up by £41,956 and goods earnings by £172,345, and the tonnage carried increased by just over 166,000. The operating ratio improved from 65.76 to 63.53 per cent. Three new sections of line were under construction during the quarter, (1) St. James to Wynyard, (2) Sutherland to Cronulla, and (3) Sandy Hollow to Maryvale. On (1) excavation and concreting of tunnels were in progress, and the sinking of caissons for Quay station and approach viaducts was continued. Buildings were also demolished for the construction of a new road from George Street to Pitt Street. The final location of (2) was completed, and air-compressor plant was at site, and general preliminary work begun. In the case of (3) earthwork was in progress and materials for bridges were assembled. The section of the Carlingford branch from Clyde junction to mile 14, ch. 11, to serve Rosehill racecourse, was electrified and brought into use, and in continuance of the programme of Thermit welding, the equivalent of 5½ miles of single track were completed during the quarter.

Anglo-French Railway Advertising

Our Personal columns this week record the honour done by the French Government to Mr. Cuthbert Grasemann, Public Relations and Advertising Officer of the Southern Railway, in conferring upon him the insignia of a Chevalier of the Legion of Honour, for his services to tourism between France and Great Britain. Advertising of holiday attractions carried out jointly by the Southern Railway and the railways of France is a development that has taken place entirely since Mr. Grasemann's appointment as Public Relations and Advertising Officer. A new step in Anglo-French railway publicity relations was taken last year, when it was agreed that all advertising in England of the combined French railways should be carried out in

consultation with Mr. Grasemann. Progress in this respect has been rapid, for it was only some five years ago that joint advertising was begun, by a scheme with the Northern Railway of France to encourage visitors to England. Two years ago joint advertising was started with the P.L.M., and it was from this step that the present general co-operation in publicity between the Southern Railway and all the French systems developed. Last year there was considerable joint advertising with the Nord and the Wagons-Lits Company of the new train ferry.

Rochdale in London

A new record for a single railway excursion was established on Saturday, May 22, when nine thousand people were brought in 20 special trains from Rochdale to Windsor, and London. The trip was organised by the *Rochdale Observer*, the passengers consisting of the paper's readers from Rochdale, Bacup, Milnrow, Wardleworth, Castleton, and other towns in the neighbourhood. An interesting feature of the excursion was that all four main-line companies, a steamship, and several bus companies participated in it. Every one of the seats had been booked nine months in advance. Of the special trains run by the L.M.S.R., seven travelled via Brent and then on to the Southern Railway to Windsor (Southern), returning from St. Pancras; and six travelled via Leamington and then on to the G.W.R. to Windsor (G.W.R.), returning from Euston. Seven trains were provided by the L.N.E.R. running via Banbury and the G.W.R. to Windsor (G.W.R.), returning from Marylebone. The itinerary of the excursion included a tour of Windsor Castle, and for the earlier arrivals, a short river trip. No fewer than 180 buses were used to convey the party from Windsor to Alexandra Palace where a concert attended by Miss Gracie Fields—the greatest living Rochdalian—was held. Afterwards the excursionists were free to explore London. The first return train left London at 1.30 a.m. and the last at 2.30 a.m. on Sunday morning. Elaborate arrangements had been made to prevent any confusion. Every passenger carried a numbered badge which corresponded to the train, bus, and seat block numbers in the Alexandra Palace.

Rhythm in Railway Names

The Times in a recent leading article alluded in happy vein to the modern use of initials for the names of persons and institutions. L.M.S. for instance is quoted as an admirable name for a railway. "The train pulls out on the first two syllables and lets out steam with a complacent hiss." L.N.E.R. gallops to the right rhythm, but G.W.R. is hopeless. The examples quoted by *The Times* might be extended indefinitely and, as in the case of persons, railways sometimes are and sometimes are not, known by their initials. Before the 1921 merger the old Lancashire and Yorkshire was always the "L. & Y." although the neighbouring North Eastern was never abbreviated and the Midland was always the "Midland." Farther afield there is the same distinction, and across the Channel the Nord and the P.L.M. are familiar examples, while still farther South the Norte of Spain compares with the Madrid Saragossa & Alicante, which is always referred to as the M.Z.A. This reminds us that one of the minor outward signs of the conflict in Spain is the spate of initials, painted or chalked on railway and road vehicles. But in this case the initials do not refer to the railway but are those of the particular union or syndicate working the line. Most of the wagons and even the locomotives, are more or less adorned with the initials in big, white or red letters, of the two principal unions, the C.N.T. and the U.G.T., and in Catalonia especially,

of the P.O.U.M., the U.H.P., and the dreaded F.A.I. In an earlier generation the Spaniard would have scorned to abbreviate, and now he has gone to the other extreme.

* * *

Smoke and the Design of Stations

The experiments with a paintbrush carried out by the L.N.E.R. on its London termini would have been even more of a success had not the "green woods in spring effect" at Marylebone experienced a premature winter; the rather brilliant appearance of Liverpool Street given place to an air of dissipation; and even the austere grey in such harmony with the utilitarian architecture of King's Cross station become more than a little blackened. The agency that has destroyed these works of art is of course the fiery breath of the steam locomotive. We feel that John Evelyn would not have approved of this mechanical Philistine, and would certainly have urged that it be banished and proscribed as a "vile vulcano." But perhaps the fault lies not so much with the locomotive as with the architect, who would not conceive the idea of the platforms being used merely as a convenience for loading and alighting from the train, with just sufficient protection from the weather, but housed them and the station concourse, booking hall, refreshment and dining rooms, and other offices, as a single unit under an all-over roof. The roof, moreover, tends to entrap the perpetual wreathings of evil smelling, sulphurous smoke, which seeps into every corner and cranny of the station. What opportunities were lost under this system of making the offices and appointments of our great railway termini a bye-word for cleanliness and freshness, if not for aesthetic charm.

* * *

The Results of Not Making Sure

The summary on page 1038 of Major Wilson's report on the accident at Roade, L.M.S.R., on November 27, 1936, shows that the cause was quite clearly the signalling of an express from Manchester over a junction cross-over from up slow to up fast while an engine, attached in rear of some vehicles—part of a divided train—which it had propelled from Roade Cutting signal box, stood some 84 ft. on the wrong side of the fouling point. Major Wilson places the initial responsibility on the signalman, who did not take adequate steps to make sure of the engine's exact position, merely glancing out of the window and estimating it from the tail light and a side light on the adjacent van, although the infrequency of such movements had given him no opportunity of gaining a reliable judgment in such a matter. He could have had correct information from the stationmaster, who was on the ground; the latter unfortunately failed to grasp the seriousness of the position and to ensure the engine stopping where it would leave it safe for the express, of the approach and route of which he was well aware, to cross the junction. He had not had very much outdoor operating experience and was no doubt flurried by the circumstances and anxiety to avoid delay. It is another case of the human element, which can be counteracted but not eliminated. Major Wilson does not consider any additional apparatus to be called for at Roade, however, as it would very seldom be required to function and all that is needed is to take reasonable care when such special movements are made.

* * *

Floodlighting in Railway Shops

Electricity plays an important part in railway activities, apart altogether from its use for traction purposes. In the field of lighting it is to be found in practically every

department of the railway, mobile and otherwise. We have on previous occasions commented upon the use of electric lighting for assisting locomotive enginemen in inspecting their engines, as for instance on many of the Reichsbahn locomotives, which are equipped with permanent electric lights fixed below the running board so that by the manipulation of a switch the whole of the running gear and lubricating points are illuminated. This represents a great improvement on the older system of paraffin torches, not only on account of the superior lighting effects, but also in the interests of cleanliness and convenience. More recently one of the railways in America has fitted up a new system of lighting in the erecting shop of its locomotive works, the engines under repair being flood-lit and adequate localised illumination provided where it is most wanted. In view of the fact that the fitting and adjustment of machined and other parts can be so much more readily and accurately effected where good lighting is available, there is much to be said for the system referred to.

* * *

Cast Steel in Locomotive Construction

A paper recently contributed to the proceedings of a railway club in America, summarised the experience gained with cast-steel locomotive frames. It was stated that the use of the one-piece steam locomotive bed, which embodies integrally the component parts of the frame and cylinder structure, has, since its introduction in 1924, been so extended that with very few exceptions it is now being applied on nearly all modern locomotives built in the United States and Canada, and to some extent also in Australia. The almost impossible task of permanently holding together with bolts the parts of the built-up locomotive frame, especially in high-speed service, has been mainly responsible for the transition. Those familiar with the problem of the present-day steam locomotive built to meet existing and prospectively higher speed requirements, know that every device likely to increase the speed, efficiency and availability of the locomotive must be resorted to, and to secure this result recourse is being made to higher boiler pressures, permitting smaller cylinders and lighter reciprocating parts. It has been proved by experience that locomotives equipped with cast steel beds can make longer continuous runs without attention, and secure a much higher monthly mileage.

* * *

The Quota Spirit

In the minds of generations to come, railwaymen may replace the police as vehicles of advice and assistance. The force may retain its traditional facility in telling the time, but the average person will doubtless always try to avoid accepting its hospitality for a night's lodging. Yet we read in *Quota News*, the journal of the L.M.S.R. Commercial Department, of a benighted traveller, carried somnolently past his station amid the rich cushions of the last electric train home, who was only too glad to accept the invitation of a friendly porter to spend the night at his apartments. That episode earned for the L.M.S.R. another of the congratulatory letters which make such encouraging reading in *Quota News*, as evidence that the paper and the scheme for which it stands are fulfilling their purpose. Selecting a few words at random from this eulogistic correspondence, we would quote allusions to the care, efficiency, and often the kindness of the company's servants. Whatever may be said in the course of academic argument upon the merits or demerits of competition, it is clear that the competitive spirit engendered internally among the L.M.S.R. staff by the Quota scheme is of benefit to themselves and to the public.

The Nizam's State Railway

PENDING the issue of the usual accounts and statistics, a preliminary review of transportation matters in Hyderabad State for the year ended March 31, 1937, has been prepared, and we are indebted to the Agent, Mr. E. W. Slaughter, for a copy of this. The railway mileage has been increased by 12 miles during the year, a branch having been built from Jankampet to Bodhan in the Nizamabad district. The immediate object of this branch is to serve a new sugar factory at Bodhan, but the line is the beginning of railway development in the area irrigated by the Nizamsagar project. No other extensions have been begun but projects for a broad-gauge chord line between Purli and Aurangabad, the conversion to broad gauge of the existing metre gauge line between Aurangabad and Manmad, and a metre gauge feeder line to Adilabad, have been provisionally approved after exhaustive examination of projects for the development of the system. The Purli-Manmad connection will provide a through broad gauge route to Bombay and north *via* Manmad. Some re-organisation has taken place notably in the locomotive workshops and in a better division of the functions of the Commercial and Transportation Departments whereby the Commercial Department has been left free to deal with purely commercial matters. Road transport, which was formerly controlled by the Chief Commercial Manager, has been made an independent department under the Agency. The Commercial Department now deal with claims, rates and fares, co-ordination of road and rail matters, catering and publicity (which has received considerable attention), and advise on industrial development in the State. There have been other less important improvements in the Engineering and Transportation Departments. These changes combined with the improvement in traffic conditions are expected to result in an increase of net earnings of about Rs. 24 lakhs (26 per cent. better than the previous year's figures) for the whole system which includes sections of railway between Dronachellam and Kurnool and between Bezwada and Gangineni worked by H.E.H. the Nizam's State Railways for the Government of India. It is expected that the net earnings of H.E.H.'s Government lines will be similarly increased. The preliminary figures in lakhs of rupees are as tabulated below. It is unlikely these will be appreciably in error.

	1935-36	1936-37 Forecast
Gross earnings	212	229
Working expenses	121	114
Net earnings	91	115
Net earnings of Government of India lines	5	6
Net earnings of H.E.H.'s Government lines	86	109

The tonnage hauled has increased from 2½ million tons to 2½ million tons and gross ton miles have increased from 1,495 millions to 1,581 millions. In spite of this increase of traffic working expenses have been reduced from Rs. 121 lakhs to Rs. 114 lakhs, and the improved efficiency of the locomotive department is reflected in the reduction of engine failures by 31 per cent. (from 51 to 35). These results are very satisfactory. The increases in traffic have been mainly in cotton, oil seeds, and coal. Wagon loads of these commodities have increased from 51,000 in 1935-36 to 65,000 in the year under review. Passenger traffic was approximately the same as in the previous year about 8 million passengers were carried.

Certain improvements have been effected in facilities offered to the public. Additional passenger services have been provided between Hyderabad and Bhongir, Hyderabad and Kazipet, Hyderabad and Nizamabad, and be-

tween Nanded and Purli. Other services have been accelerated notably that between Secunderabad and Bidar. The time for this return journey has been reduced from 12 hr. 44 min. to 8 hr. 43 min. Special arrangements have also been made for quick transit of goods between Warangal and Secunderabad or Hyderabad. Goods booked one day are now delivered on the day following, and no fewer than 426 reductions in goods rates have been made. In the next issue of our Road Transport Section we hope to deal with the section of this report covering road services and road-rail co-ordination. The latter includes the provision of local collection and delivery services; the establishment of further out-agencies at various important places; and the inauguration of excursions in which bus and rail have been used to take passengers to sites of interest and beauty in the Nizam's Dominions. The issue of special "travel-as-you-like" tickets has enabled passengers to travel anywhere in the system during specified periods; that they were popular is evidenced by the fact that 40,000 were sold. Apart from better facilities in connection with the number, speed, and cost of services, improvements have been effected in quality and comfort. One more buffet car for third class passengers has been provided; reservation of third class accommodation in through service carriages has been introduced; and ice containers for cooling carriages in the hot weather have been provided.

* * * *

The Coronation Scot

THE attractiveness of the 6½-hour timing between Euston and Glasgow, to be inaugurated by the London Midland & Scottish Railway in July next, will be increased by the fact that the journey will be made in new and very comfortably-appointed trains hauled by streamlined locomotives specially built for the service. The distance by the L.M.S.R. route is 401½ miles, and the actual running time, allowing for a 5-min. stop at Carlisle, 385 minutes, an average speed of 62.6 m.p.h. The style of painting adopted, namely Coronation blue with silver striping, gives a most striking outward appearance to the new locomotives and trains, and the use of chromium plated fittings, and new pattern electric lighting and upholstery designs in the coaches, combine to effect a *tout ensemble* upon which it would be very difficult to improve.

The streamlined locomotives are of the 4-6-2 type, and in their general assembly follow the lines of Mr. Stanier's "Princess Royal" class; there are, however, several features in their design, apart from the streamlining, that rank them as an improved edition of that very excellent class. The increased diameter of the coupled wheels, *i.e.*, 6 ft. 9 in. as compared with the 6 ft. 6 in. of the earlier engines, is important seeing that high continuous speed is aimed at. After all, the amount of really stiff climbing between Euston and Glasgow is restricted to about 30 or 40 in a total of 401 miles, and if on these sections a little may occasionally be lost, it will be more than made up for on the level and easier graded portions of the journey. The design incorporates slightly larger cylinders, and a new arrangement of valve mechanism with only two sets of gearing in place of four, the inside valves deriving motion through rocking levers pivoted on needle roller bearings. The latter are utilised in the valve motion generally, together with light pattern piston valves each having six narrow rings to ensure steam-tightness, so that the mechanism of the engine incorporates all the points required in a locomotive which has to keep a train moving at a fast speed for several hours on end. When we turn to the boiler, we find that here also improvements have been effected. The superheater is of

considerably increased size, affording 856 sq. ft. in place of the former 653 sq. ft. of heating surface; a grate area of 50 sq. ft. is provided, the firebox heating surface has been increased, and the combined heating surface, which in the earlier engine was 2,967 sq. ft., has now advanced to 3,663 sq. ft. The boiler is an excellent example of high powered design in all respects, including the smokebox and piping, which have been arranged in such a manner as to facilitate the removal of ashes. As on former occasions when locomotives of a new series are being built at the L.M.S.R. Company's works, we have been enabled by Mr. Stanier's courtesy, to visit Crewe during the construction of the first of the "Coronation" class and have seen the engine advance from one stage of completion to another, from the time the frames were laid down to that at which the finished locomotive left the erecting shop for painting. The general arrangement and cross sectional drawings forming the subject matter of the folding plate in the present issue, provide, in conjunction with the particulars and illustrations on pages 1019-1030, a means of studying the design of the new locomotive in detail, whilst the arrangement and equipment of the coaches for the new trains can also be followed.

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The Baillie Committee Report

THE Baillie Committee Report (summarised on pages 916 and 917 of our issue of May 7) is a notable document, for its recommendations affect every single operator in the road motor goods transport industry, not excluding owner drivers. In order to appreciate the intricacies of the problems involved a brief outline of the history is necessary. Before the Road and Rail Traffic Act, 1933, came into force the only statutory obligation imposed upon persons engaged in the carriage of goods by road in respect of the working conditions of their drivers was that contained in Section 19 of the Road Traffic Act, 1930, which determined limits on the periods of driving. Except in that part of the industry which was conducted by the railway companies no national joint machinery for the negotiation of wages in the road transport industry existed before 1934. The 1933 Act provided that observance of the fair wages requirement should be a condition of every A and B licence, and early in 1934 there was inaugurated, with the blessing of the Minister of Labour, a National Joint Conciliation Board for the Road Motor Transport Industry (Goods) in England and Wales, which was an entirely independent and autonomous body. The attempt of the board to lay down scales of wages met with hostility and led to local attempts to defeat the purposes of the board. Indeed, so many difficulties were encountered by the board in its efforts to provide a stable basis of wages and working conditions that representations were made in March, 1936, to impress on the Ministers of Labour and Transport the need for a greater degree of observance of the wages and conditions decided upon by the board. It was also urged that holders of C licences should be subjected to the same degree of regulations as holders of A and B licences. The Ministers of Labour and Transport agreed that it was desirable to consider the means by which the progress already made in the better regulations of the working conditions of road transport workers might be further advanced, and accordingly the Baillie Committee was set up in July, 1936.

The committee's investigations have been thorough. Its public sittings occupied seventeen days and the list of bodies and persons tendering evidence is an impressive one. It recommended the establishment of a Central Board and Local or Area Boards (corresponding to the Traffic Areas) to deal with all matters affecting the work, wages and

conditions of drivers and statutory attendants employed on vehicles operating under A or B licences. The initiation and final approval of all proposals for establishing or varying wages or conditions is to rest solely with the Central Board, which is to consist of representatives of national organisations of employers and employed, representatives of each Traffic Area and three independent members (including a chairman) appointed by the "appropriate Minister." It is further recommended that the Minister should be empowered to confirm, by order, the recommendations of the Central Board and thus give them statutory effect, it being made a condition of every A and B licence that the wages and conditions so confirmed by the Minister should be duly observed. Machinery to ensure such observance is a feature of the proposals, and the cost of giving effect to the scheme is to be charged against the receipts from licensing fees.

If the scheme appears to be drastic it is important to remember that the industry is largely "unorganised and disorganised" and, in the words of the committee, "without some more definite and effective method of wage regulation the chaotic conditions which have existed in the industry will continue. . . . Wages form an important element in working costs and those conditions inevitably create unfair competition." This mention of competition reminds us that the railway companies have a two-fold interest in the committee's report, first of all, because it is recommended that drivers and statutory attendants employed by the railway companies and falling within the purview of the machinery of negotiation for railway staff should be excluded from the new machinery. The railway position, says the committee, affords a "refreshing contrast" to the present chaotic state of affairs existing in the road transport industry generally. "It is not surprising," it continues, "that when the existing National Joint Conciliation Board was constituted no step was taken to include within its scope representatives of the railway companies or their employees. We are of opinion that no departure from this position is called for." Truly the railways have earned and merit the special treatment recommended, since for years past elaborate and effective machinery of joint negotiation has been utilised on their systems for dealing with wages and conditions of service. The railways are also profoundly interested in the effect which the introduction of the proposed new regulative machinery will have in the matter of road competition. The application of the new regulations will assuredly result in raising the level of the wages and conditions of motor drivers, with consequent beneficial effect, not only upon the health of the men, but upon the important aspect of safety on the road. But, apart from these indirect effects, we believe that the regulations will also help directly to check that unrestricted competition which not merely exists but thrives upon low wage levels. The committee says that "uneconomic competition should be checked and competition arises from difference in the rates of charges for transport quite as much as from variation of wages." The fixing of rates is under consideration by the Transport Advisory Council but the Baillie Committee regards "the fixing of wages for the industry as a necessary first step, but it is neither practicable nor desirable to make a standard wage depend on a prior determination of rates. Wages are necessarily an element in the consideration of the rates to be fixed, and having regard to the importance of paying a 'fair' or reasonable standard wage to drivers, it is right that rates should depend on wages and not wages on rates."

Although this view may command general agreement there is likely to be vigorous opposition to the recommendation that C licence holders should become subject to regulative machinery, different though it may be from

that to govern A and B licences. Recognising the strength of the evidence submitted both for and against regulation, and foreseeing the animated discussion which the recommendations will arouse, the committee devotes no fewer than fourteen pages of its report to the C licence problem. It says, however, that it seems "to be of the first importance to bear in mind that C licensees are, alike with A and B licensees engaged in the transport of goods by motor vehicles on the highway; and that the interests of these three classes of licensees cannot be severed from one another or from the interests of public service as a whole, on behalf of which they all receive a licence."

The committee offers an ingenious solution by dividing the C licence drivers and attendants into two classes; (i) those engaged in certain sections of retail distribution (other than those employed by firms whose transport is organised as a distinct and separate branch or department of the business); and (ii) other C licence drivers and statutory attendants. Appropriate machinery is suggested for each class. The report represents one more endeavour to tidy up the chaos that must inevitably arise when the individual attempts to survive as an individual under the ruthless regimentation necessary when the accepted policy of the nation is to reduce supply to demand.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

The Rehabilitation of China's Railways

Caledonian Club, May 25

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—My solitary reference to "bandits" in my lecture to the China Society, extracts from which were reported in your issue of May 14, has excited more comment than it deserved. Opinion seems divided as to whether I have underestimated or overestimated their importance in the China of today.

I stated that one of the objections to company managed lines was that bandits might be attracted to them, but actually I cited the Ministry's objections of some years past. Today the police guard on trains is almost the only relic of a state of affairs which is passing away, though so-called bandits and/or communists do exist in some of the more out-of-the-way places. I gather from a recent film that Hollywood does not agree with me in this opinion, but I persist in it.

Mr. Welford's letter in your issue of May 21 is of interest, but I have evidently given a wrong impression to cause him to write "the difficulties that had to be overcome were not, apparently, engineering or material ones, but of the provision of money."

Making bricks without straw was not considered an easy task in biblical days and human capacity has not greatly improved since that time. The excerpts from my lecture did not include details of the make-shifts used to keep the lines in operation, and many of these would have surprised conservative engineers.

Not only was robbery of spares from engines awaiting repair normal practice, but cramping and/or lining of loose tyres; welding of tubeplate-holes; and even jointing two good halves of tubeplates and other firebox plates; welding and/or total removal of superheater elements; welding of journals and wheel seats, &c., &c., were commonly practised, all of which were, to say the least, unorthodox. Similar make-shifts in bridges, permanent way, and all other branches of railway work had to be practised.

If the definition is accepted that "an engineer is a man who can do for one dollar what any darn fool can do for two," then some at least of China's railwaymen proved themselves of that category. It is, however, but a truism to say that every railway engineer is half a financier. If he is not continually worried by finances then there is something wrong with him and with his railway.

Mr. Welford is perfectly correct when he speaks of the financial side as being of paramount importance, but the foregoing will demonstrate how inextricably mingled are the financial and technical problems of a railway. Mr. Welford speaks of "money," but by this I presume he includes not only cash, but capital in the form of spare parts, stores, and coal, which sometimes, though expressed in terms of money, were provided by indirect barter of service for supply. I refrain from following up the question of capital and money, interesting as the subject is.

Yours faithfully,

KENNETH CANTLIE

The London-Sheffield Train Service

London, May 25

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Your editorial note in the May 21 issue entitled "Escaping the Tide" on the London-Sheffield train service seems to advocate as a principle that so long as there is something showy in the window it does not matter how poorly the shop is stocked. Surely the reorganisation and acceleration of the whole service between these two cities is the desideratum, rather than the slight acceleration of an already fast express in order to be able to say that Sheffield has a faster train from London than in pre-war days. The minimum journey times on the routes over which an effective service is given—the Midland, and the Great Central—reflect, with the increased loads of today, a good deal more credit on the railway companies than did those of pre-war days, while the additional stops now made at Leicester and Nottingham have conferred benefits on those places—a point that must have consideration. It is perhaps paradoxical—although too much importance need not be attached to the fact—that the fastest service of the day by any route consists of *one* through carriage only! The following is the average journey time per train on the effective weekday service between London and Sheffield: In the down direction, L.N.E.R. (G.C.), 3 hr. 24 min. (on Saturdays, 3 hr. 19 min.); L.M.S.R., 3 hr. 28 min. (on Saturdays, 3 hr. 35 min.). In the up direction, L.N.E.R. (G.C.), 3 hr. 34 min.; L.M.S.R., 3 hr. 22 min. How much difference to these figures will the paring of ten minutes off the time of one train make? Another thing which it would be well to try and rectify is the clashing of departure times on the G.C. and Midland routes, such as at 3.20 p.m. and 3.30 p.m., 4.55 p.m. and 4.55 p.m., 6.20 p.m. and 6.15 p.m., respectively in the down direction; and 7.30 a.m. and 7.15 a.m., 11.20 a.m. and 11.6 a.m., 3.30 p.m. and 3.24 p.m., in the up direction.

Yours faithfully,

"SHEFFIELD"

THE SOUTHERN RAILWAY AND ANTI-AIRCRAFT DEFENCE.—The Southern Railway hopes to form its own anti-aircraft unit, which will be one company of the 35th Battalion (First Surrey Rifles) of the Territorial Army, if sufficient recruits from its staff are forthcoming. The headquarters of this battalion is at Camberwell, a convenient situation for Southern Railwaymen, most of whom live and work in South London. If the attempt is successful, the unit will be the first railway anti-aircraft company in the country. It is hoped that the personnel of the unit, both officers and men, will ultimately be found almost entirely from the staff of the Southern Railway. To arouse interest in the scheme the First Surrey Rifles gave a demonstration of searchlight drill at New Cross Gate at 8.45 p.m. on Tuesday last, May 25, when aeroplanes were employed to represent enemy raiders. The Financial Secretary to the War Office and the Director General of the Territorial Army and other officers, together with many directors and chief officers of the Southern Railway, attended the demonstration.

PUBLICATIONS RECEIVED

The Electrician Annual Tables of Electrical Undertakings. Fiftieth Edition: 1937. London: Benn Brothers Limited, Bouverie House, Fleet Street, E.C.4. 12 in. \times 9 $\frac{1}{2}$ in. 242 pp. Price 10s. net (postage 9d. extra).—Although the 1937-38 edition is the Jubilee issue of this volume, it has been in existence for a shorter time than 50 years, but appeared originally with greater frequency and in smaller form as a journal supplement. The work, now issued annually in May, contains comprehensive tables covering the home country, the Empire overseas, and foreign undertakings. The arrangement is geographical, as the book is intended primarily to be a reference work to all the details of supply in given localities, and the aim is to list every place in Britain which has a supply of any significance, and also the more important centres in the British Empire and foreign countries. Apart from the systems of supply, consumers' voltages, prices of current, addresses of head offices and showrooms, and similar information of interest to the consumer or the supplier of electrical apparatus, the technical details of supply, of interest to the supply engineer himself or his manufacturers, are fully listed. Under this heading, for example, are given the number of consumers, generating and transmission voltages, generating sets, and converting and steam-raising plant. An important section of the book is a brief but lucid summary of the state of technical development of the Grid system, including a map of the transmission lines.

Zwei Mitteleuropäische Eisenbahnsysteme in der Weltwirtschaftskrise (Two Central European Railway Systems during the World Economic Crisis). By N. G. Ehrnrooth. 1937. Helsingfors: Finnish Academy of Science. 85 pp. 9 $\frac{1}{2}$ in. \times 6 $\frac{1}{2}$ in.—This clearly written and instructive booklet, presented to the Finnish Academy of Science, follows the fortunes during the economic depression from 1929 onwards of the Saar railways, when administered by the governing commission of that territory, and the French State Railways as ordinarily understood, that is, omitting the Alsace-Lorraine lines, which are, of course, State property. The author has not only made an exhaustive study of the literature on both subjects, but has had special opportunities of obtaining first-hand information on the Saar lines, his father having been concerned with their management during the period of the commission. These lines formed a relatively small system—only 407.8 km. (253.4 miles) of route, but carrying an important traffic, and many expressed grave doubts of the possibility of conducting them with efficiency. The present work is really an attempt—a successful one, as we read it—to prove that the Saar railways were well managed and not a burden to the terri-

tory; on the contrary, they contributed their part to its well-being and, when everything is properly analysed and considered, made a profit. Many sums were charged to the railway accounts which did not properly form part of them, while numerous rates and fares were fixed to meet industrial demands and special circumstances, which really meant that the railway accounts were debited with charges that were aid-given to other concerns. The author gives a very clear picture of the finances of a railway undertaking whose independent existence is now only of historical interest, but whose management reflected considerable credit on those responsible for it.

In the pages dealing with the French State Railways the author gives an outline of their origin and the economic position in the years preceding the Dautry regime, when the whole system got into an unsatisfactory condition, and proceeds to describe the steps taken by that administrator to put the organisation on a sound footing, together with the numerous improvements in equipment and services. Both parts of the book bring a number of valuable facts together in a condensed form, and are supplemented by a useful list of works and articles for further information.

Bombay: The Gateway to India. Issued by the Rotary Club of Bombay. 12 $\frac{1}{2}$ in. \times 9 $\frac{1}{2}$ in. 111 pp. Fully illustrated. No price mentioned.—This well-produced and illustrated volume opens with a facsimile of a letter from Lord Brabonne, Governor of Bombay, expressing the debt of Bombay to the Rotary club for its enterprise in publishing this book to bring that city before the business world. A fine full-page portrait of His Excellency faces this letter, and a key plan of the port follows four pages later. There are also photographic illustrations of the Gateway of India, typical scenes in and around the city, including Government buildings, museums, gardens, clubs, the caves of Elephanta, industrial activities and transport, notably of Bombay Central station, B.B. & C.I.R., Victoria terminus G.I.P.R., "one of the most beautiful railway stations in the world," and the B.B. & C.I.R. administrative offices.

The text deals with the history of the city and the port, with its numerous facilities, including the Port Trust Railway. This system handles nearly half the rail-borne traffic of Bombay, and comprises about 120 miles of track linking the main lines with the wharves, docks, depots and landed estates. The municipality; industrial possibilities; information about factories, sites, construction costs and land tenure details; industrial labour; and communications form the subjects of chapters. Some 2 $\frac{1}{2}$ pages are then devoted to the two main-line railways already mentioned, and include their brief histories, extent,

labour employed, traffics, both goods and passenger, electric traction and other details. Further chapters are devoted to electricity and gas supplies, customs tariff, insurance, health, income-tax, banking, hints to commercial visitors and other matters helpful to anyone visiting or trading with Bombay; also to cotton, agriculture, the suburbs, hill stations, the Chamber of Commerce, Indian Merchants' Chamber, and social amenities of the city.

Country Walks. Third Series. London: London Passenger Transport Board, 55, Broadway, S.W.1. 6 $\frac{3}{4}$ in. \times 4 $\frac{1}{4}$ in. 124 pp. Illustrated. Paper covers. Price 3d. net.—The third series of "Country Walks" booklets published by London Transport includes several in the popular Chiltern Country and neighbourhood, and will introduce many users to new attractions of this area. One walk, for example, is planned to show memorials of William Penn; another follows the ancient earthworks—relics of the encampments of primitive peoples—that abound in this district; and a third is a tour of the Roman remains at St. Albans and Verulamium. Besides these rambles in Bucks and Herts, others in the book lead through picturesque country in Surrey, Kent, Berkshire, and Essex. In conformity with the other booklets in this series, information is given as to transport facilities for reaching the starting points of the walks. Thanks to the lucid maps, no user need fear losing his way.

Mercury Vapour Lamps.—A leaflet with details of Osira 80- and 125-watt H.P. mercury vapour electric discharge lamps reaches us from the General Electric Co., Ltd., Magnet House, Kingsway, W.C.2. This low wattage range is intended for the lighting of streets of secondary importance, for use with supplies of 200 volt a.c. and over. The light output is three times that of a tungsten filament lamp of similar wattage. Particulars of choke coils, condensers, and other equipment for lighting installations using these lamps are given in the leaflet.

Floodlights and Floodlighting.—This useful catalogue from the General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2, contains not only particulars of floodlighting equipment, but notes on complete illumination schemes as applied to large buildings. Several pages in colour show most effectively the possibilities of floodlighting with coloured lamps. Among the numerous illustrations of floodlit premises is one of Baker Street station, Metropolitan Line of London Transport, with one of the Inner Circle platforms thus illumined. The prominence thereby given to the poster advertising reveals attractions in this form of publicity which sometimes have not the chance to do themselves justice in underground stations. That floodlighting has its utilitarian applications also is demonstrated by the equipment at the Cockfosters depot, Piccadilly Line, London Transport, which is illustrated.

THE SCRAP HEAP

Answer to Railway Problem No. 7

500. If W, B, R and G be the number of white, blue, red and green tickets issued, then $W = B + R + G$ (i), $B = 2R$ (ii), $R = 3G$ (iii). From these equations

$$W = 2R + R + \frac{R}{3} + \frac{10R}{3},$$

also $W + 2B + 3R + 4G = 875$ (iv).

Putting $W = \frac{10R}{3}$ in (iv),

$$\frac{10R}{3} + 4R + 3R + \frac{4R}{8} = 875,$$

whence $R = 75$.

Railway Problem No. 8

THE OCEAN BELLE

When that popular pleasure steamer, the *Ocean Belle*, started on her trip she carried CGE passengers, FG of whom were adults, and EE children. Of the latter, AA were boys, and BB girls. At her next port of call, DA further passengers embarked, bringing the total up to FGC.

Can you turn these letters into numbers and say how many passengers were then upon the *Ocean Belle*?—From "A Problem a Day," by R. M. Lucey. *Faber & Faber*. 5s. net.

* * *

As from June 1 next, children travelling on the Imperial Government Railways of Japan, if accompanied by adults, will be carried free up to the age of six instead of four as previously.

* * *

A signalman undergoing examination by a block inspector was asked what steps he would take if he were to see two trains approaching his box on the same line. Without hesitation he replied: "I should take the signalbox steps!"

* * *

It is interesting to note that improved equipment [on the Chicago-California trains] has resulted in improved passengers. We have noted instances where passengers boarded the train in unpressed or untidy clothes but retired to change after noting the appearance of the interior of the train. Male passengers have gone the length of shaving in the morning, so that the old-time overnight coach atmosphere has virtually disappeared.—Mr. W. A. Harriman, Chairman, Union Pacific Railroad.

* * *

A BISHOP ON A TROLLEY

Mr. E. S. Daws, director of the West of India Portuguese Railway, the Southern Mahratta Railway, and the British India Steamship Company, left Mormugao by a special train on the 20th, and passed over the Ghats and the West Deccan line to Poona. This is the first train that has passed through, and shows how soon the line may be expected to be opened for pub-

lic traffic. The Archbishop of Goa, returning from Belgaum, trollied down the whole Ghat, a distance of 16 miles, from Castle Rock Station to Collem, on the previous day. The descent is over 1,600 feet.—From the "Bombay Times" of December 23, 1887.

* * *

A Great Western Railway Signalman at Oxley sidings tried to reverse the facing points for the passage of a goods train but was unable to do so. On examination it was found that without knowing it he had achieved the almost impossible feat of catching a large rat between the blades of the facing points.

* * *

TAIL WAGGER WAG

Written on a card, attached to a box in which was a dog, recently carried by the Great Western and London Midland & Scottish Railway companies from Swansea to Derby, were the following lines:—

"Good morning, Mr. Porter! I've had a lovely run,

But I've got a date at Derby at exactly half-past one.

Please grab me and my cottage, and with all your might and main,

Run up the stairs, across the bridge, to catch the Derby train.

And thank you Mr. Porter! tho' I can't pronounce your name,

My little wagging rudder will reward you just the same."

It did! The dog was duly delivered "On Time."

* * *

THE GAY 'NINETIES

The Southern Railway's contribution to the night life of the "gay 'nineties" is reflected in the following extract from a family magazine of the period: "The London, Brighton, and South Coast Company have made the following alterations (amongst others) in their train services. The 11.50 p.m. theatre train from Victoria, which has hitherto run only on Thursdays and Saturdays, will run every week-night, and call at Burgess Hill on Mondays, Hassocks on Tuesdays, Hayward's Heath on Wednesdays and Saturdays, Horley on Thursdays, and Three Bridges on Fridays, so as to afford the residents in those towns an opportunity of visiting the London theatres, and reaching home the same night."—From "Pennyfare."

* * *

A TRUE STORY

In the days before the formation of the four main-line companies, a party consisting of four gentlemen was travelling up from Wemyss Bay to Glasgow in a Caledonian Railway train. Suddenly, one gentleman noticed that one of his companion's trousers were on fire. He called out to the victim, who hurriedly brushed a hot cinder from his knee—but not before it had made a nasty burn in the cloth. The distressed passenger was sitting in the corner facing the engine, and the

LONDON LAUGHS . . . By LEE

No. 926. SEEING LONDON



"Now here, my boy, is an interesting survival connected with a bygone mode of transport."

An "Evening News" cartoon. This is the fourth week of the London strike, but the buses are due to resume service today (Friday)

cinder, obviously, had come through the open window.

When the train arrived at Glasgow Central the passenger made his way to the stationmaster's office to find out what the Caledonian was prepared to do in the way of providing a new pair of trousers. He was told that his claim would receive consideration, and he was asked to call back in a week.

Now, the mishap occurred on the Paisley and Glasgow Joint line, where the quadruple tracks were used by Caledonian and Glasgow & South Western trains. When the passenger returned to the office he was informed that the spark could not possibly have come from the chimney of the Caledonian engine, but must have come from a G. & S.W. engine which had passed on the adjoining line at the time of the accident. The passenger was accordingly referred to St. Enoch station, the headquarters of the G. & S.W.R.

Once more he stated his case, and was told to report again in a week. He was now informed, that from careful investigations made by the company, it had been proved that the spark did not come from the chimney of the aforesaid G. & S.W. locomotive. When that engine had passed the Caledonian train it was slowing down to stop at a signal, and could not have thrown out cinders. Once again the claim was repudiated.

In the upshot the passenger made a claim through an insurance company with whom he held a household policy. This company refused to acknowledge liability for damage sustained on railway property, but made an *ex gratia* payment to the policyholder.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

SOUTH AFRICA

Capital and Betterment Estimates

The estimated expenditure on capital and betterment works for the year 1937-1938 is £13,714,818, an increase of £1,284,804 on the previous year. Of this amount £7,352,969 will be chargeable to Loan and Betterment Funds and £6,361,849 to Renewals Fund and working votes. The allocation of this expenditure is as follows:—

From Loan and Betterment Funds

Construction of railways ...	£ 134,205
New works on open lines... ..	3,892,259
Rolling stock	1,105,247
Road motor services	158,391
Harbours	948,790
Airways	354,000
Working capital	510,077
Unforeseen works	250,000
	<hr/>
	£7,352,969

From Renewals Fund and Working Votes

New works on open lines... ..	£ 3,088,028
Rolling stock	2,600,160
Road motor services	323,664
Harbours	349,997
	<hr/>
	£6,361,849

Table Bay Harbour Development Schemes

An extension of the Table Bay Harbour scheme outlined in THE RAILWAY GAZETTE of March 19 has now been approved by the Railways and Harbours Board. An amount of £2,260,844 was provided in the capital and betterment estimates for 1937-38, whereas the comprehensive scheme is estimated to cost in all £5,977,599. It is expected that the larger scheme will take from eight to nine years to complete if the work proceeds normally.

Details of the work to be undertaken with the additional £3,716,755 are as follow:—

	£
Removal of rock eastwards beyond the end of berth G	199,379
Quay walls. Approximately 10,400 ft., equivalent to 12 additional berths	1,219,242
Additional reclamation	152,158
Surfacing of quays and drainage, water supplies and electric light, railway and crane tracks, roadways and storm water drainage... ..	256,789
12 single-storied cargo sheds	125,893
60 cranes erected complete	158,013
New graving dock	1,605,281

In the report of the board it is stated that the local harbour authorities had made further representations pointing out the extremely congested state of the harbour, which was causing serious interference with the efficient operation of the port. From an engineering point of view, it was represented that if a definite programme of work of sufficient magnitude and extending over a comparatively long period were not laid down, the most economical methods of construction could not be employed.

The tonnage of cargo handled at Table Bay rose progressively from

1,309,105 tons in 1933 to 2,050,125 tons last year. In the year 1932-33, 1,545 ships with a gross tonnage of 6,556,367, called at the port, handling 1,304,128 tons of cargo. For the year 1936-37, the number of ships was 3,157, with a gross tonnage of 11,318,639, handling 2,128,315 tons of cargo.

Improved Goods and Passenger Layout at Cape Town

Although not entirely interdependent, the question of an improved goods and passenger yard layout at Cape Town is connected with the enlarged scheme of harbour development, and it is considered desirable, both from the financial and practical points of view, that the two schemes should be linked together, because the reclamation work involved should, on economic grounds, be regarded as common to both. Finally, the report states, the new proposals have received the careful consideration of the administration's technical and executive officers, and the scheme has also been accepted by the Table Bay Harbour Advisory Board.

Tourist Industry

In a prospectus issued by the South African Publicity Advisory Committee it is stated that intensive and scientific study of all phases of the tourist industry, and an endeavour to improve the standard of hotel and guest house accommodation are among the objects of the public utility company which will be formed under the National Travel Association of South Africa [as forecast in our issue of March 12.—E.D. R.G.]. These objects are provisional and subject to the approval of an inaugural meeting of guarantors to be called for the purpose of forming a company. Other objects of the company are to advise the Government in all matters relating to tourist traffic, to initiate public discussions, national conferences, national broadcast talks, and public lectures acquainting tourists with South African attractions.

The promoters of the company are the Directors of Publicity in Johannesburg, Cape Peninsula and Durban. Their aim is to enlist within six months, guarantees totalling between £12,500 and £25,000 a year over a period of five years. As soon as guarantees of £12,500 have been obtained, the company will be formed and registered. The Promotion Committee is now seeking the co-operation of Provincial Governments, municipalities, transport companies and commercial and industrial undertakings.

With the establishment of the National Travel Association, the South African Railways will cease their overseas activities for the promotion of tourist traffic, but the association will not replace the functions of local publicity associations within the Union.

IRELAND

Penny-a-Mile and Rail-cum-Road Excursion Tickets, G.S.R.

During the present tourist season, May to October, the Great Southern Railways are issuing penny-a-mile tickets available for return within one month at single fare and one-third, with minima of 1s. 6d. first class and 1s. third class. These tickets are issued between all stations on the system, and also to such places as Achill and Clifden where the passenger trains have ceased or will shortly cease to run, as well as to other tourist points where the company's buses operate. In such cases the excursion fare is charged to the railhead station, and an addition is added to cover the outward and return journey by bus to and from the extended destination.

These tickets permit of break of journey both outward and return, but where the tickets are issued to points which include a journey by a road service that ceases during the month of September, the company will not be responsible for providing the return road service; in such cases passengers should book to the railhead station only.

The success of similar tickets in England has induced the G.S.R. to adopt the arrangement, and, although the density of traffic in Ireland cannot compare with that in England, there is every reason to hope that this progressive move will be equally successful in "Eire."

VICTORIA

Sydney Limited Coaches

Leading architects have assisted in the decoration of the new first and second class all-steel air-conditioned coaches for the Sydney Limited service. The end first class smoking compartments are panelled in flowery walnut, and the next smoking compartments in jarrah. In the ladies' first class compartments the panels are of royal walnut, and in their second class compartments they are of silver silkwood; the other compartments have ribbon walnut panels. Upholstery is in chrome leather; red in the smoking, grey in the ladies' and blue in the other first class compartments. For second class vehicles, maroon, grey, and green chromes have been chosen. Special wide arm-rests are provided, and a semi-indirect type of lighting suspended from the roofs has been evolved; in addition each passenger has a reading light.

Insulation

For deadening sound, the floors have a foundation of 1½-in. cork board, covered with ¾-in. of wood fibre board, over which is fixed a ⅝-in. layer of rubber sponge. Above this again is laid ¼-in. rubber linoleum, and finally carpets of good quality are provided.

The walls and roofs, too, are well protected against heat and noise.

Over both is first cemented a layer of sound-proof felting, covered in turn with Alfol, and in the roofs there is a further insulating layer of Turnall, consisting of an asbestos core covered on both sides with aluminium foil.

Goods Train Acceleration

The general overhaul of the goods timetables is giving excellent results. For example, the fast goods on the Melbourne—Wodonga section of the Melbourne—Sydney service have been accelerated by as much as seven hours. Though loads are limited to 520 tons, an average speed of 30½ m.p.h. is maintained, and only three intermediate stops are made in this 7-hr. run, one for locomotive purposes, and two for attaching and detaching cattle-wagons.

CANADA

New Air-conditioned All-steel Light-weight C.N.R. Cars

The C.N.R. has ordered 50 air-conditioned main line first-class coaches from the Canadian Car & Foundry Company, Montreal, and a number of them will be in service this summer. They will be 73 ft. 6 in. in length, and seat 64 passengers in reclining seats; a ladies' lounge at one end and at the other a smoking compartment will be separated from the main compartment by swing doors. The complete air-conditioning is to be of the ice-cooling pattern. The bodies are of special high-tensile steel, giving maximum strength with minimum weight, and have turtle-back roofs. The bogies are six-wheeled, this pattern, it is claimed, giving better riding than the four-wheel type.

New Saint John River Bridge at Fredericton

The contract for the steel superstructure of the new C.N.R. bridge over the Saint John River at Fredericton, has been awarded to the Hamilton Bridge Company. This new bridge is being built to replace the one destroyed by floods—the highest since its erection in 1888—in the spring of 1936. The new structure will be 2,000 ft. in length, and consist of 8 truss spans and one lift span, and will be 5 ft. higher in headway than the old bridge. It will be used jointly by the C.N.R. and C.P.R., as was the old one.

EGYPT

Miscellaneous Notes

Traffic of the Fuka to Mersa Matrouh line was again interrupted between April 9 and 17 on account of numerous washouts caused by heavy rain.

During a recent public holiday the State Railways ran four trains from Cairo to "unknown destinations," returning the same day. The fare was 4s. 10d. including a lottery ticket. Out of every 100 of these lottery tickets issued, three were drawn, and entitled the holders to a free excursion to the sea during the summer.

Between June 1 and September 30, first and second class week-end tickets will be issued at reduced fares from Cairo and certain other stations to Alexandria, and from El-Ismailiya to Port Said. Fourteen-day return first and second class tickets will also be issued from Alexandria and neighbouring stations to Mersa-Matrouh.

Successful Sentinel Railcars

The ten Sentinel-Cammell railcars delivered towards the end of 1935 covered some 474,800 km. in their first six months in service, with only two failures. With the exception of one serious and a few minor teething troubles at first, all had given excellent service, were popular with the crews, and easily maintained in the E.S.R. sheds and shops.

Proposed Direct Connection at Suez Junction

In connection with the Anglo-Egyptian Treaty, and improved facilities in the Canal zone, a junction between the Suez direct line and the Ismailiya—Suez line is envisaged at Suez junction, so that trains can run direct from Cairo via this direct line to Genefa and other stations on the Ismailiya—Suez line.

INDIA

Department of Communications

It is announced that the Government of India has decided to re-distribute the portfolios in the Central Government with a view to the inauguration of a Department of Communications, which will deal with all matters relating to railways, roads, civil aviation, broadcasting and posts and telegraphs. The constitution of such a department has long been urged by the commercial community and two successive Finance Members of the Government of India accepted, in principle, the desirability of a re-shuffle of portfolios. It is understood that the new department will be constituted next autumn with Sir Thomas Stewart as its head. The Government announcement, however, does not make it clear whether or not shipping and inland water transport will be included in the new Ministry. If the Department of Communications is to function effectively in the co-ordination of all the various forms of transport in the country, they should be included.

Works Programme : South Indian Railway

The Railway Budget for 1937-38 provides a sum of Rs. 80.41 lakhs for expenditure on the Capital and Depreciation Fund programme on the South Indian Railway. The expenditure will be wholly on open line works, and the bulk of the allotted sum will be found from the Depreciation Fund. In addition to a heavy programme of track renewals, funds are provided for works already in progress, the most important of which is Coimbatore Re-

modelling (stage I), including the Singanallur link, estimated to cost over Rs. 10 lakhs. The remodelling of Pollachi junction, the extension of power signalling at Madura and the renewal of girders of the Pamban viaduct, the Palar bridge and railway overbridge are other major works in hand. It is also proposed to begin stage II of Coimbatore remodelling.

The rolling stock programme is one wholly of betterments. It is proposed to replace four broad gauge passenger tank engines, and five boilers, also two metre gauge tank engines, all past normal life limit. Four broad and four metre gauge railcars are to be obtained to compete with bus traffic.

CHINA

Tsangchow-Shihchiachwang Line

The new chord line linking Tsangchow, on the Tientsin-Pukow Railway, with Shihchiachwang, on the Peiping-Hankow line, is to be constructed by a firm known as the Kochu Kungssu. This new railway will be about 300 km. in length and is likely to cost some Y.10 million. It will traverse a rich agricultural area, and will, with the Shihchiachwang—Taiyuan line, give a new east-to-west connection across Shantung and part of Shansi Province. Japanese technical assistance and materials—rails, rolling stock, &c.—to the value of about \$1,500,000 will be supplied. The former suggestion that this new line should run into Tientsin instead of Tsangchow has now been dropped.

MANCHUKUO

Two New Lines Opened

The Hsinlintun—Ihsien line, 68.5 km., in Chinchow Province, and the Ningnien—Heierhken railway, in Lungkiang Province, were expected to be opened for provisional traffic on April 1.

Hulutao Harbour Works

The South Manchuria Railway completed a further stage of the work on the port of Hulutao on April 6. The work was begun a year ago, and a breakwater and two long piers have been erected at a cost of Y.16,000,000.

S.M.R.'s 30th Birthday

Great celebrations took place throughout the parts of Manchukuo served by the South Manchuria Railway to mark the 30th anniversary of the taking over of the railway from the Japanese Government early in April 1907. Mr. Matsuoka, the President, addressed a great gathering in Dairen.

Speaking of the remarkable development of the corporation, he said that its original capital was Y.100,000,000 whereas at the present day it was Y.2,000,000,000 (about £140,000,000). Of course this included the subsidiary industries of the corporation, coal and other minerals and its other interests.

THE EVOLUTION OF RAILWAYS—III

By CHARLES E. LEE

THE families of Lyddell and Montague became associated in the working of Blackburn, or Burdon Moor, colliery and leased the coal under the freehold lands of Thomas Dawson and William Davison at Tanfield, and of Ralph Clavering, junior, at Causey. They thereupon began to build the longest and most remarkable wagon-way so far laid down. The works, described in 1738³³ as having been constructed "at the expense of many thousand pounds," included some large cuttings, an extensive embankment across the valley of Beckley

and to enter into a friendship and partnership for the purchasing or taking other collieries, and for winning and working of coals thereout, and to exchange benefits and kindnesses with each other, upon a lasting foundation." This agreement gave the one powerful group a virtual monopoly of the most valuable mineral district in the north of England.

Upon the entry of George Bowes into the group and the formal establishment of the Grand Allies, Bowes contributed his share of the expense incurred "in making

A recent view of the Causey arch, County Durham, which was built about 1727 to carry a double-track wagon-way of 4-ft. gauge



Burn, and a single-arch stone bridge called Dawson's bridge or the Causey arch. This wagon-way was visited in September, 1725, by Dr. William Stukeley, accompanied by Richard Gale, and the following account³⁴ of their visit has survived: "We saw Colonel Lyddal's coal-works at Tanfield, where he carries the road over valleys filled with earth, 100 foot high, 300 foot broad at bottom: other valleys as large have a stone bridge laid across: in other places hills are cut through for half a mile together, and in this manner a road is made, and frames of timber laid for five miles to the river side, where coals are delivered at 5s. the chaldron." Dr. Stukeley mentions loaded vehicles running by gravity down the wagon-way, and being checked by a wooden brake lever on one wheel.

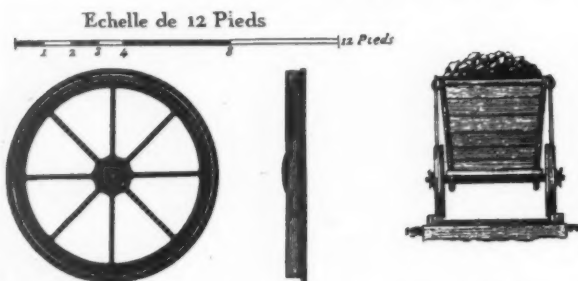
Wayleave difficulties eventually resulted in the establishment of the most powerful partnership that the coal trade has known. It was commonly known as the "Grand Allies" and comprised (1) the Hon. Sidney Wortley Montagu, his son, the Hon. Edward Wortley Montagu, and Thomas Ord of Newcastle; (2) Sir Henry Liddell and Col. George Liddell (or Lyddal) of Ravensworth Castle; and (3) George Bowes, of Gibside. The last-named had estates at Marley Hill and Hedley, rights over Hedley Fell, a joint interest in Park Head colliery and, about 1725, purchased a colliery at Shield Row. The agreement of the Grand Allies was dated June 27, 1726, and was designed "to join some of their collieries

and erecting the bridge called Dawson's bridge, and of drifting into and winning the colliery called Mr. Dawson's colliery." As we have seen, work on the bridge had already been undertaken before the new partnership came into being, but the precise date when it was brought into service is unknown. It was built by Ralph Wood, a local master mason, and the date 1727 (presumably that of completion) formed part of the inscription "Ra. Wood, Mason, 1727" on a sundial built into one of the piers. A copy of the inscription was made in 1787, at which time a writer stated that the bridge had long been abandoned owing to the closing of one of the important collieries served by the wagon-way which crossed it.

Apart from the wagon-ways already existing or under construction when the partnership was formed, the Grand Allies extended their main line to Beamish South Moor and Shield Row, a distance of eight miles from the River Tyne and the furthest that such wagon-ways to that river stretched. The districts immediately to the west were served by the lines of other owners running to the River Wear. As already indicated, the Causey arch was not the only prominent engineering work on this important system of wagon-ways. The embankment at Beckley Burn was 100 ft. high and 300 ft. broad at the base. Its construction necessitated making a drift through the rock for the course of the diverted stream. The embankment now carries the Tanfield branch of the L.N.E.R. and is probably the oldest railway embankment in the world to be still in use. The Causey arch itself is a slightly flattened arch of 103 ft. span built of freestone. It is 35 ft. high from a base line through the springing points

³³ "Brief for the Coalowners," February, 1738.

³⁴ "Itinerarium Curiosum."



Coal wagon on a 4-ft. wagon-way in County Durham (with details of the flanged iron wheels) from "*Voyages Metallurgiques*" by Gabriel Jars (1765)

to the underside of the arch and about 10 ft. thence to the road surface. The road itself is about 22½ ft. wide and formerly accommodated a double track timber railway of 4 ft. gauge.

Practically all the coal from the Tanfield and the South Moor district at one time passed over the wagon-way to the Tyne. It would appear that in 1732 an average of about 400 Newcastle chaldrons (each of 53 cwt.) a day was conveyed and it may be supposed that this quantity had increased when the line was visited in 1765 by M. Gabriel Jars, of the Royal Academy of Science at Paris; he recorded in "*Voyages Metallurgiques*" that "it was almost always covered with wagons." Incidentally, we are indebted to M. Jars for recording the 4-ft. gauge with precision when he says that the rails were thus placed at this distance from each other "la largeur interieure du chemin."

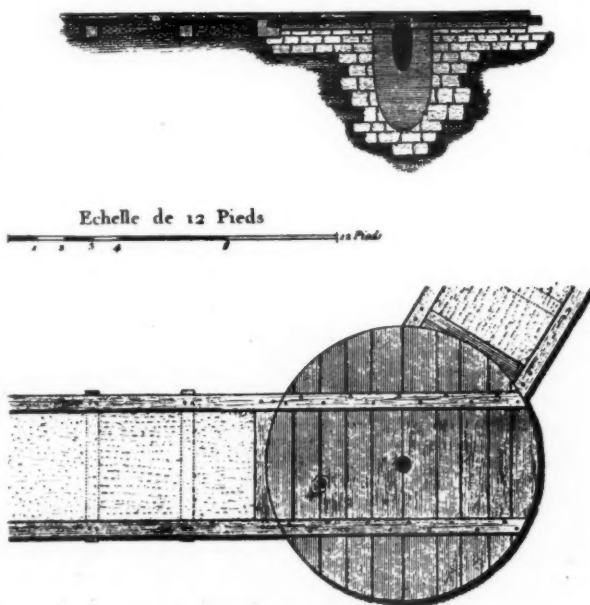
The description by M. Jars of permanent-way construction at that period is very interesting, and the following is a rough translation from his "*Voyages Metallurgiques*" of the pertinent section: "When the road has been traced at 6 feet in breadth, and where the declivities are fixed, an excavation is made of the breadth of the said road, more or less deep, according as the levelling of the ground requires. There are afterwards arranged along the whole breadth of this excavation pieces of oak wood, of the thickness of 4, 5, 6, and even 8 inches square; these are placed across, and at the distance of 2 or 3 feet from each other; these pieces need only be squared at their extremities, and upon these are fixed other pieces of wood, well squared and sawed, of about 6 or 7 inches breadth, by 5 inches depth, with pegs of wood; these pieces are placed on each side of the road along its whole length: they are commonly placed at 4 feet distance from each other, which forms the interior breadth of the road." M. Jars also described and illustrated the mine wagons in use at Newcastle and particularly the large wheels which were either of solid wood or of iron with

spokes, and with flanges from 1 in. to 1½ in. in depth. He added that the size of the front and back pairs should be unequal (the front pair being the larger) in order to maintain horizontal the load of coal in the wagon which always travelled on a slope in the same direction. Jars also illustrated turntables.

Another contemporary illustration of the type of permanent way and vehicle described by M. Jars appeared in 1773 in the "*Recueil des Arts et Metiers*." In this picture both iron and wooden wheels are shown, and although flanges are not indicated, the fact that the wagon is descending a curved track by gravity with the horse following clearly indicates that there must have been some flange to keep the wagon on the rails. There is no reason to suppose that any different method was adopted from that clearly illustrated and described by M. Jars only eight years earlier and in respect of a similar wagon.

In order to maintain the continuity of the story in the County Durham area, strict chronological order has been departed from, and so flanged iron wheels with spokes have been mentioned for the first time in a quotation from a book of 1765. Actually there is a detailed and illustrated description some thirty years earlier in a work called "*A Course in Experimental Philosophy*," by John Theophilus Desaguliers, which was published in London in 1734. Similar text and illustrations appeared in the French edition that was produced in 1751. Desaguliers was dealing with the flat wagons used by Ralph Allen on his wagon-way at Priory Park, near Bath, to convey stone from his quarries to the quay on the river Avon. The wagon wheels were of cast iron about 20 in. in diameter and had 6-in. flanges on the inside. Unlike those used in the Tyneside area, the wheels were of equal diameter.

The wagon-way itself, which was built about 1731, was a mile and a half long and was on a descent with a gradient averaging 1 in 16. The rails were squared timbers, probably of oak, about 6 by 5 inches in section and laid to a gauge of 3 ft. 9 in. As this wagon-way was built not for coal traffic but for the conveyance of Bath stone, the vehicles were not mere mine wagons but rectangular flat wagons of very robust construction and

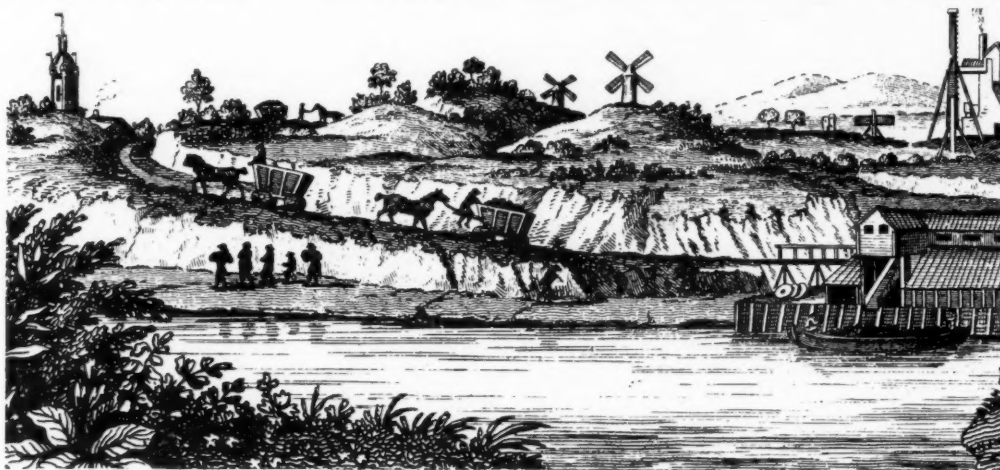


Wagon-way turntable illustrated by Gabriel Jars in "*Voyages Metallurgiques*" (1765)

surprisingly modern appearance. The frame, formed of four oak beams 14 ft. long and 4 in. square, carried a solid platform of oak planks 13 ft. long by 3 ft. 6 in. in width. Movable sides could be attached by hooks to the rigid ends. Under the frame were two strong pieces of timber attached with iron carrying a half ring of copper in which, being well lubricated, the axles turned with little friction. The axles were about 3 in. in diameter; one end was squared and the other round. The wagons, being four-wheeled vehicles, had two axles so arranged that the square end of the rear axle was on the opposite side of the vehicle from the square end of the front axle. This arrangement permitted of all wheels being braked independently as, when the wheel on the square end (and with it the axle) were braked, the wheel on the round end could turn independently, and vice versa. Braking was

9 in., which was doubtless selected in relation to the size of stone blocks.

It would appear that the original wooden rails were normally of oak in lengths of about 6 ft. and of the type of construction outlined by M. Jars. A subsequent development, in order to facilitate repairs, led to fixing an additional, and more easily replaced, wooden rail on top of the first. New construction on this principle enabled fir or pine to be used for the bottom rail with a hardwood top rail of oak, beach, or sycamore to provide the wearing surface. A pamphlet³⁵ entitled "Extracts from the Letter-book of William Scott" has fortunately preserved interesting details and prices of railway material in the middle of the eighteenth century. By this time mineral railways were used extensively, and their construction and maintenance had resulted in extensive imports into Newcastle



A double-track wagon-way shown on part of the engraved title to a "Plan of the Collieries on the Rivers Tyne and Wear," published in 1788 from surveys by John Gibson

controlled by a long wooden lever. These remarkable wagons were stated to have cost £30 each. In May, 1731, Elias Thornhill, a whitesmith of Sunderland, obtained a patent³⁵ for "his new invention of making the rim or edge of coal waggon wheels with iron or steel and with iron ribs or tabbs and iron bolts, rivets, and screws for fastening the same."

So far considerable attention has been paid to the surviving evidence as to the introduction of wagon-ways and flanged wheels, and the available information demonstrates that the earliest railways were not public highways; that they were built to carry only the traffic of their owners—usually minerals; and that a special form of vehicles, namely one with flanged wheels, was used. Of the permanent way itself, it has been seen that it was normally of a form of construction approximating to that used at the present time, inasmuch as the rails were laid on transverse sleepers and that easy gradients were secured even at the expense of heavy earthworks, cuttings, and bridges. With regard to gauge, a point to be noted is that it appears to have varied according to the type of load to be transported and the form of motive power used. Thus in early Central European mining practice when men pushed small wagons loaded with heavy mineral ore, narrow gauges of 2 ft. or under were adopted. In the County Durham coalfield horse traction was employed and somewhat larger wagons used, and the evidence of M. Jars is to the effect that a normal gauge was 4 ft. At Bath the Prior Park quarry line had a gauge of 3 ft.

and Sunderland of rails, planks, and wagon wheels, from various parts of the south of England, particularly from Sussex and the New Forest, which were the main English sources for the supply of timber. The following quotations from his letters give a good idea of the kinds of wood used and the prices paid:—

January 31, 1745-46.—"The wheels made up of the pieces you sent are yet unsold, the prices runs (*sic*) very low at present occasioned by too many wheels being imported last year, the dealers mostly having six or nine months' stock by them at this place, and you may judge by the following advertisement how full Sunderland is. January 25. To be sold at Sunderland a fresh parcel of birch wheels and beech rails and plank at the lowest prices, enquire of Thos. Smith, who will shew the same. Who these wheels, etc., belongs too, I know not, but the advertisement standing in our newspaper makes the dealers here expect wheels and rails for almost nothing."

February 28, 1745-46.—"You say you have bought a parcel of rails you formerly wrote about, if you mean ash rails they'll come too late, for the gentleman that wanted them is already served. . . . I find the best oake rails will scarcely give 6d. per yard this year, as there will be a great many cut in this country and led to the wagon ways at 6d. per yard. This parcel of rails proved very indifferent and were badly squared."

June 8, 1746.—"I expect to get sold this week at or about 7s. a wheel."

July 13, 1746.—"The best wagon wheels will now scarce give 5s."

March 27, 1747.—"No less than about 2,000 (wheels) com'd within these 14 days from Lyndhurst."

October 20, 1747.—"It may not be amiss to inform you some people begin to want wagon wheels . . . my friends Mr. Shafto and Mr. Bell begin to own they want, and there will be beach

³⁵ "Archæologia Aeliana," quoted by H. M. Tomlinson.

³⁶ Published at Newcastle-on-Tyne in 1848 by M. A. Richardson.

rails wanted."—"The sooner 10 or 15 load of more plank comes the sale would be made more certain, for in the spring there will be of it coming from other parts and better wood. About 100 wagon wheels of large sizes would not come amiss now."

January 8, 1747-48.—"Beach rails will not be wanted as formerly. I mean not so many, the long wagon ways being on the decrease."

According to Mr. M. Dunn³⁷ "In 1745, the cost of a yard of wooden way was 4s. 2d., viz., two yards of oak rails, 1s. 2d.; three sleepers, 2s. 6d.; pins, 1d.; laying, 3d.; filling and ballasting, 2d."

On curves and gradients strips of wrought iron were fixed on top of the wooden rails in Germany in very early years, and these strips were called *Reibeisen*. There is little doubt that this was the first use of metal for rails, but on the Continent, probably because of the high cost of iron and the plentiful supply of available timber, the use of these *Reibeisen* does not appear to have been extended beyond places of maximum wear. In Great Britain the use of iron plates to strengthen wooden rails is believed to have been introduced at least as early as 1716³⁸, but the present writer has been unable to trace contemporary evidence. Nicholas Wood quoted an anonymous author as saying,³⁹ without advancing his authority, "that, in 1738 cast-iron rails were first substituted for wooden ones; but, owing to the old wagons continuing to be employed, which were of too much weight for the cast iron, they did not completely succeed in the first attempt." Plates, probably of foreign origin, about 2 in. wide and $\frac{1}{2}$ in. thick, are stated to have been used at Whitehaven collieries, Cumberland, in 1738, and the consequent improvement in the surface of the track to have shown a marked effect on the economy of transport. The pioneer at Whitehaven was Carlisle Spedding, who was responsible for these experiments with iron.

The next development took place in Shropshire, where Abraham Darby, the principal proprietor of the famous Coalbrookdale Ironworks, built additional smelting furnaces at Horsehay. He concluded⁴⁰ arrangements in 1749, 1750, and 1752, for the necessary land for a wagon-way in order that:—

Coals may be conveyed in the easiest and best manner, to make a wagon way and lay rails on sleepers in such manner as is commonly used, and with coal wagons and horses and oxen to draw the same on or along the said railway to Coalbrookdale.

This railway was made about as far as Horsehay about 1750 and was extended to new furnaces at Ketley in 1757, thereby completing a continuous line from Ketley to the river Severn, a distance of five miles. The wooden rails are understood to have been of $3\frac{1}{2}$ in. by $4\frac{1}{2}$ in. section, fixed on transverse wooden sleepers. Abraham Darby retained the customary size of wagon and fitted cast-iron flanged wheels. An interesting and important use of cast-iron for rails took place on this line in 1767; and the story has been related in so many contradictory ways that it is worth while examining the details carefully. First we have the statement⁴¹ of Mr. Jonathan Hornblower, writing in 1809. He said "Railways have been in use in this Kingdom time out of mind, and they were usually formed of scantlings of good sound oak, laid on sills or sleepers of the same timber, and pinned together with the same stuff. But the proprietors of Colebrook-dale Iron Works, a very respectable and opulent company, eventually determined to cover these oak rails with cast-iron, not altogether as a necessary expedient of improvement, but in part as a well-digested measure of economy in support of their trade. From some adventitious circumstances (which I need

not take time to relate), the price of pigs became very low; and their works being of great extent, in order to keep the furnaces on, they thought it would be the best means of stocking their pigs, to lay them on the wooden railways, as it would help to pay the interest by reducing the repairs of the rails; and if iron should take any sudden rise, there was nothing to do but to take them up, and to send them away as pigs. But these scantlings of iron (as I may call them) were not such as those which are now laid in some places; they were about 5 ft. long, 4 in. broad, and $1\frac{1}{4}$ in. thick, with three holes, by which they were fastened to the rails, and very complete it was both in design and execution. Hence it was not difficult, if two persons on horseback should meet on this road, for either to turn his horse out of the road, which, on the railways now introduced, would be attended with some serious doubt as to the consequences."

Although it has often been stated that the Coalbrookdale line was laid originally with angle-iron plates, and subsequently with cast-iron plates of similar type, there appears to be no justification for the suggestion that the original metal strips were of angle-iron form. The statement just quoted clearly refers to the original line as being constructed with oak rails, and it is highly improbable that the temporary expedient of facing the rails with iron as a means of stocking pigs would have been accompanied by a change in method that involved altering all the wheels. Furthermore, Hornblower states specifically that the rails were not such as those later laid in some places which made it difficult to ride a horse on and off the track.

In the Transactions of the Highland Society of Scotland for 1824 (Vol. VI) a contribution from Robert Stevenson—the famous Scottish civil engineer and lighthouse builder, includes the following: "I some years since visited the great iron-works of Colebrook Dale, in Shropshire, where cast iron was indisputably first applied to the construction of bridges; and according to the information which I have been able to obtain, it was here also that railways of that material were first constructed. It appears, from the books of this extensive and long-established company, that between five and six tons of rails were cast on November 13, 1767, as an experiment, on the suggestion of Mr. Reynolds, one of the partners."

This statement of Robert Stevenson's is further borne out by the records of the Coalbrookdale Company that 800 tons of cast-iron rails were produced in the years 1768 to 1771. The intended temporary use of iron rails apparently proved so satisfactory that it was adopted as a permanent feature. A few years later we have a brief statement on the subject in the diary⁴² of the well-known traveller, Arthur Young, where he says that on June 13, 1776, after "Crossing the ferry where Mr. Darby has undertaken to build a bridge of one arch of 120 ft. of cast-iron, I passed to his works up Colebrook Dale. The wagon ways that lead down to the river instead of wood are laid with cast iron; and these made for the lime stone waggons as the steep hills are so contrived that the loaded wagon winds up the empty one on a different road."

In later years, of course, the Coalbrookdale and Horsehay lines consisted of angle-iron tram plates—such as are still in service there—but this does not invalidate the strong reasons for believing that the original iron rails were flat bars. The "Victoria County History" (already quoted) states that the same wagons "continued to be used long after rails of cast-iron had been substituted for the wooden rails, and until a narrower gauge of road and a different pattern of rail were introduced."

³⁷ "View of the Coal Trade," by Matthias Dunn.

³⁸ See the article "Railways" in "The Penny Cyclopædia," published in London by Charles Knight & Company in 1841.

³⁹ Transactions of the Highland Society, Vol. VI.

⁴⁰ "Victoria County History: Shropshire," Vol. I.

⁴¹ Observations by Jonathan Hornblower, in the Appendix to the Third Report of the (House of Commons) Committee on Highways, 1809.

⁴² "Tours in England and Wales," by Arthur Young, published in the "Annals of Agriculture," A Tour to Shropshire, June 13, 1776.

THE CORONATION SCOT, L.M.S.R.

New 4-6-2 locomotives and nine-coach trains built specially for working the L.M.S.R. accelerated 6½-hour express service to be inaugurated between Euston and Glasgow on July 5. The engines are streamlined, and, like the trains, finished throughout in blue and silver

THE locomotive which, by the courtesy of Mr. W. A. Stanier, Chief Mechanical Engineer of the London Midland & Scottish Railway, we illustrate and describe herewith, is the first of a new series of five engines numbered 6220 to 6224 inclusive, now being built at the company's works at Crewe. This engine, No. 6220, bears the name *Coronation*; it has just been completed and will be followed in due course by the others of the series, which will be named as follow:—

6221	<i>Queen Elizabeth</i>
6222	<i>Queen Mary</i>
6223	<i>Princess Alice</i>
6224	<i>Princess Alexander</i>

These new locomotives represent a development of the earlier 4-6-2 engines of the "Princess Royal" type, but in addition to being provided with streamlining, the boiler is of considerably greater capacity, while certain improvements have been made to the frames and valve motion. The tender is also of increased capacity, and is fitted with a steam-operated coal pusher to bring the coal forward to the fireman's shovel when the supply is getting low. One of the accompanying illustrations shows the apparatus fitted in the tender. The form of streamlining adopted was finally decided after very careful experiments with models in the L.M.S.R. Research Department's wind tunnel at Derby, where tests were carried out to represent both headwinds and winds crossing the track at various angles.

In the course of our recent visits to the Crewe works during the building of the first engine, one of the most interesting features seen was the manner in which the bulbous front end of the boiler streamlining was achieved. It was built up on a specially prepared wooden jig or framework, ensuring accuracy and the proper fitting together of the casings when mounted on the engine. We later witnessed the fitting of the streamlined portions of the engine itself, and the photographs reproduced herewith were taken by THE RAILWAY GAZETTE photographer at various stages during the construction of the engine; with this issue also we reproduce on a folding plate a sectional elevation, plan, and cross-sections of the locomotive.

It is interesting to compare the principal particulars of the earlier 4-6-2 locomotives, Nos. 6203-6212, with those of the new series, so that the differences between them can be readily noted, and the following table gives the particulars required for this purpose:—

	Earlier locomotives, Nos. 6203—6212	New locomotives, Nos. 6220—6224
Cylinders (4), dia. × stroke	16½ in. × 28 in.	16½ in. × 28 in.
Valve gear	4 sets Walschaert	2 sets Walschaert
Valve travel	7½ in.	7½ in.
Coupled wheels, dia.	6 ft. 6 in.	6 ft. 9 in.
Boiler		
Working pressure	250 lb. per sq. in.	250 lb. per sq. in.
Firebox heating surface	217 sq. ft.	230 sq. ft.
Tube heating surface	2,097 "	2,577 "
Total	2,314 "	2,807 "
Superheater	653 sq. ft.	856 sq. ft.
Combined heating surface	2,967 "	3,663 "
Grate area	45 "	50 "
Tractive effort, at 85 per cent. boiler pressure	40,300 lb.	40,000 lb.

Additional particulars are obtainable from the drawing on page 1022, and the folding plate. It is by the kind co-operation of Mr. Stanier that at this early stage we are able to present these detailed drawings of the locomotive to our readers, even before the engines have gone into service.

Boiler and Firebox Details

The boiler shell is constructed of nickel steel, and the inner firebox of copper. The firebox stays are of steel, with the exception of the outer and top few rows which are of Monel metal; the throat plate stays are also of this material. The firebox is extended into the barrel to form a combustion chamber with the object of allowing the gases to complete their combustion before entering the tubes. The large flues are screwed into the firebox before being expanded. The firedoor is of the sliding type, carefully designed to direct the incoming secondary air down on to the fire.

A Davies & Metcalfe exhaust steam injector with 13 mm. cones is fitted on the fireman's side, and on the left hand or driver's side of the engine is a live steam injector with 13 mm. cones; both injectors are of the flooded type. The injectors deliver to the boiler through top feed clack valves which discharge into trays within the steam space, wherein any gases contained in the water may become disengaged; the de-aerated water is finally discharged through pipes below the water level. The superheater has 40 flue tubes, all containing triple elements 1 in. outside diameter, so that the steam passing to the cylinders is split up into 120 paths. The regulator, of the grid type, is located in the steam dome. Baffle plates are provided beneath the dome to prevent water from lifting and entering the steam pipe. To facilitate the removal of ashes particular care has been taken in designing the smokebox so to arrange the steam and exhaust pipes that the smokebox bottom is free as far as possible from all obstructions.

The boiler is fitted with four pop safety valves 2½ in. diameter. Steam for the various fittings is taken from a manifold on the top of the firebox backplate in the cab. The fittings are of the company's standard type, and it may be mentioned that the carriage warming reducing valve is of increased capacity in order to deal adequately with long trains. The boiler is provided with a sand gun of the railway company's standard type, which enables the tubes to be cleaned during a run.

Frames, Cylinders, and Motion

The main frames are 1½ in. thick, and are of high tensile steel. At each side at the hind end two separate frame plates are spliced to the main frames, and carried through to the hind buffer beam. The outer frames are splayed outwards, and the inner frames inwards to take the side bearers for the trailing two-wheeled truck. As already indicated, there are four cylinders, of 16½ in. diameter × 28 in. stroke. The piston valves are 9 in. diameter with a maximum travel of 7½ in. There are two sets of Walschaert gear, situated outside the frames, which drive the outside piston valves direct and the inside ones by means of rocking levers; the whole arrangement is specially designed to allow the removal of both sets of valves for examination with the minimum amount of

trouble. The valve motion is provided with Hoffmann needle bearings, except the big ends of the eccentric rods, which are fitted with SKF self-aligning ball bearings. The lubrication of the needle bearings is by means of a grease gun.

The exhaust passages in the cylinders have been carefully designed to give free exit to the steam without providing an excessive volume which would act as a reservoir. The exhausts from the inside cylinders and from the two outside cylinders are combined in the saddle casting, so that the blastpipe is a simple straight pipe. The piston valves are designed for lightness, and are fitted with six narrow rings to ensure steam tightness. The pistons are of the box type, screwed on to the piston rods, and are provided with three narrow rings. Mechanical lubrication is provided for the cylinders, and the oil to the piston valve liners is atomised by being mixed with a jet of saturated steam taken from an independent supply on the boiler, so that atomised oil is supplied continuously while the engine is running, either with the regulator open or shut. In addition to the feeds to each of the piston valve liners there are feeds to each piston packing, and two feeds to each cylinder barrel, one at the top and one at the bottom.

The crossheads are of the two-bar type and are steel castings with bronze slippers, having the surfaces which make contact with the slidebars white-metalled. The gudgeon pin is prevented from turning in the crosshead by two keys, and is secured by a split cone and nut. The coupling and connecting rods are of Vibrac steel, and are designed to withstand the inertia stresses due to high speeds. The tyres are secured by the Gibson ring type of fastening, and the wheel rims are of triangular section. The balance weights are such that 50 per cent. of the reciprocating weights are balanced, equally divided between the coupled wheels. The whole of the revolving parts are balanced in each wheel.

Axles, Wheels and Springing

These axleboxes are steel castings with pressed-in brasses completely lined with white-metal on the bearing surface. There are no oil grooves in the crown of the box to disturb the continuity of the oil film, but the oil from the mechanical lubricator is introduced through a row of holes on the horizontal centre line of the axle. Hollow axles are used throughout, the internal diameters being $4\frac{1}{2}$ in. for the coupled wheels, 3 in. for the trailing wheels and 2 in. for those of the leading bogie. In addition to mechanical lubrication, every axlebox underkeep is fitted with an efficient oil pad arranged to be easily withdrawn for examination. A dust shield is also provided on the inside faces of the intermediate and trailing coupled axleboxes. The supply of oil from the mechanical lubricator is taken through a spring loaded back-pressure valve fixed at the top of the axlebox, the function of which is to keep the oil pipes full of oil while the engine is standing, so that delivery to the journal will begin immediately the engine moves. The sides of the axleboxes are fitted with bronze slippers, making contact with the faces of the axlebox guides.

Side bolsters transmit the load from the main frames to the leading bogie. The bearing springs are of the inverted laminated type, with screw adjustment. The trailing two-wheeled truck is of the Bissel type, and the bogie arm is anchored to the engine cross stretcher immediately in front of the firebox throat plate. As in the case of the leading bogie, the weight from the main frames is taken through side bolsters.

All the laminated bearing springs for the engine and tender are made of silico-manganese steel; the plates are of a ribbed section with cotter type of fixing in the buckle.

The spring links are screwed to permit of adjustment. Rubber damper springs are also provided between the spring link heads and the frame brackets for the coupled wheels. A steam brake is provided, actuating brake blocks arranged at the front of the three pairs of coupled wheels. The brake gear is compensated to give equal pressure on each brake block. The driver's brake valve controls proportionately the application of the steam brake on the engine and the vacuum brake on the train. Separate steam valves are used for controlling the steam to the large and small ejectors. A vacuum pump, driven from one of the crossheads, is also provided.

Other Engine Details

The cab of the locomotive has double sliding windows fitted on both sides, and small glass screens on the outside, which can be turned into position when the engine-men are looking outside the cab, act as draught preventers. There is a hinged window giving ample area for lookout on each side in the front cab-plate. Tip-up seats are provided on both sides of the cab, and gangway doors are fitted between the engine cab and tender panel plates. Steam sanding is applied in front of the leading and middle coupled wheels for running in a forward direction, and behind the middle coupled wheels for running backwards. Oil gun lubrication is used on certain parts, such as the brake gear, spring gear, reversing gear in cab, and at other points.

Tender Details

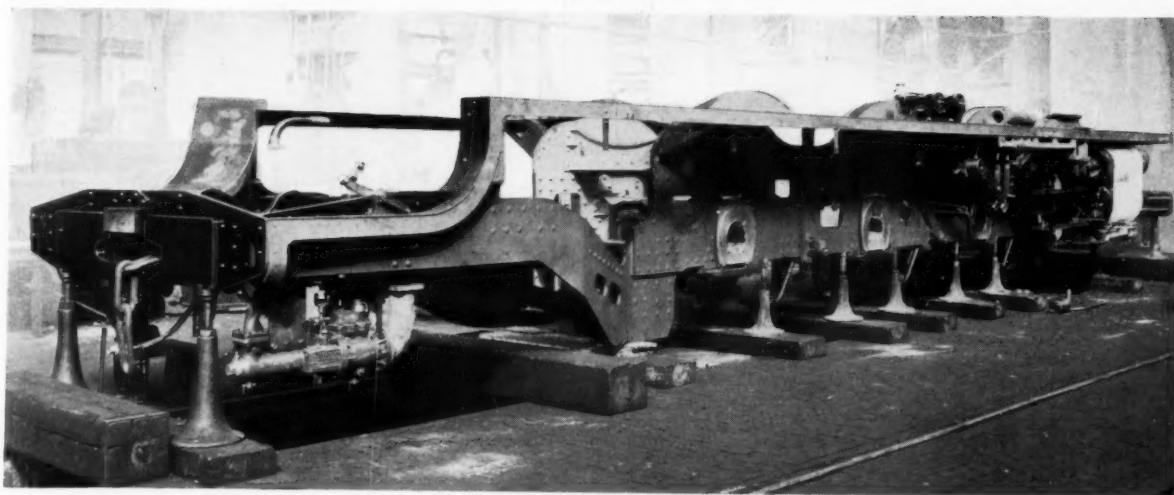
The tenders carry 10 tons of coal and 4,000 gallons of water, and are modified in shape to match the streamlining of the engine and shape of the coaches. The coal pusher, already mentioned, consists of a steam cylinder mounted on the back of the bunker which can be used to push the coal forward to the fireman's shovel towards the end of the run, and thereby save considerable manual effort. A door is arranged to give access to the coal bunker from the footplate, and on the fireman's side a long receptacle is provided to carry the fireirons. The tender is provided with water pick-up gear of the company's standard type, fitted with a deflector in front of the scoop to reduce wastage of water. Oil gun lubrication is also used for such items as the handbrake and water pick-up handles.

The colour scheme of the locomotives and trains is exceptionally pleasing, namely, a Coronation blue with silver bands, giving a uniform and striking appearance throughout. The nickel-chrome fittings used on the coaches further add to the attractive style of finish. We make editorial comment on page 1008.

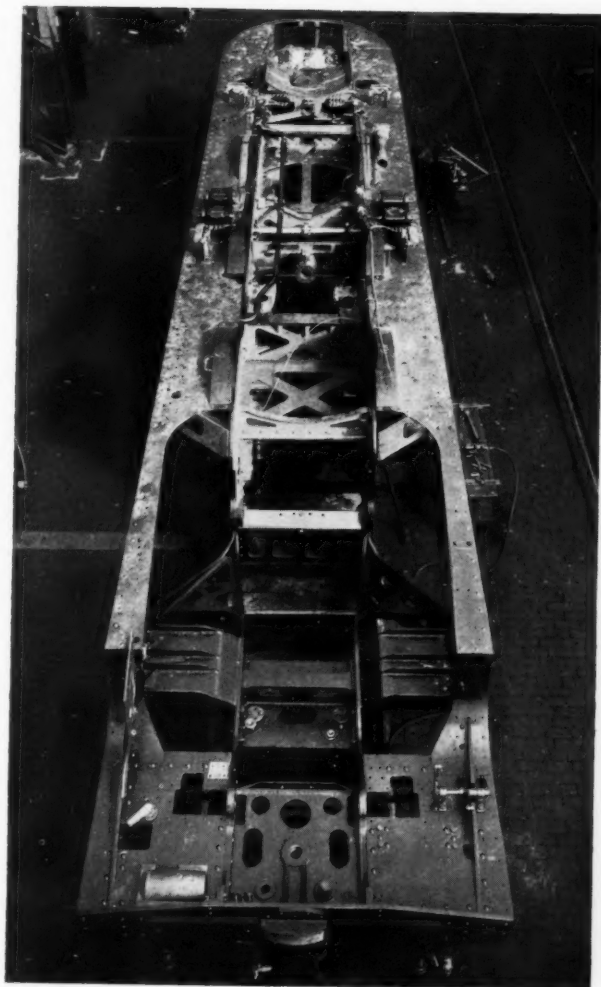
Details of the Coronation Scot Trains

The first of the Coronation Scot trains to be introduced on the new $6\frac{1}{2}$ -hour service between Euston and Glasgow, and hauled by the streamlined express engine illustrated and described, has just been completed at the L.M.S.R. works at Wolverton. Three trains are being prepared, arranged as shown in the diagram dimensioned drawing on page 1029. The total seating capacity of each train is 232 passengers—82 first class and 150 third class—and the total weight of the train is 297 tons. The general construction of the coaches follows L.M.S.R. standard practice, the body sides, ends, and roof being covered with steel panels finishing flush with the windows. The exterior painting is carried out in blue, with four bands of silver running the full length of the train between the windows on the carriages and continuing at the same level on the engine to finish in a "V" shaped point on the front of the smokebox streamlining. The car numbers and lettering are in silver plain block characters, and the exterior fittings such as door and commode handles are

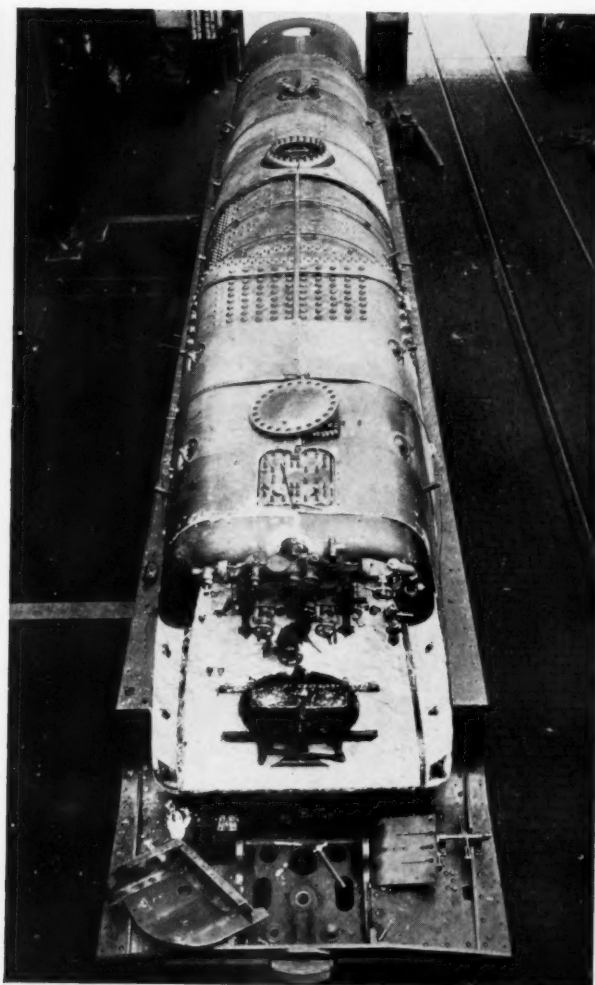
(Text continued on page 1030)



View of main frames from trailing end

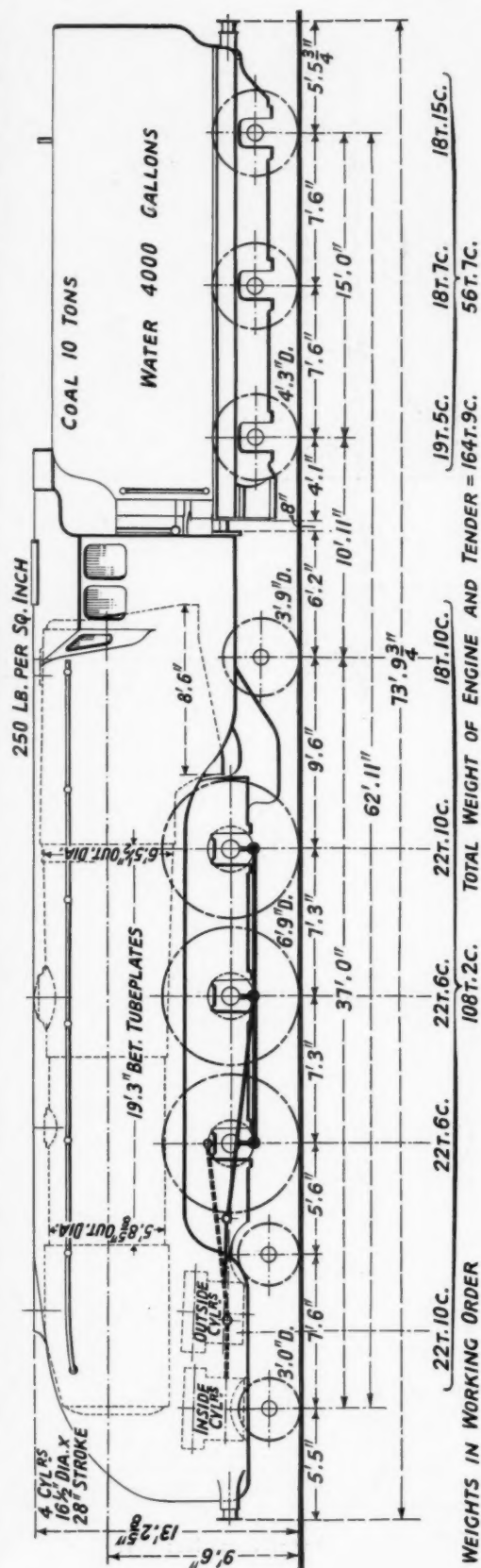
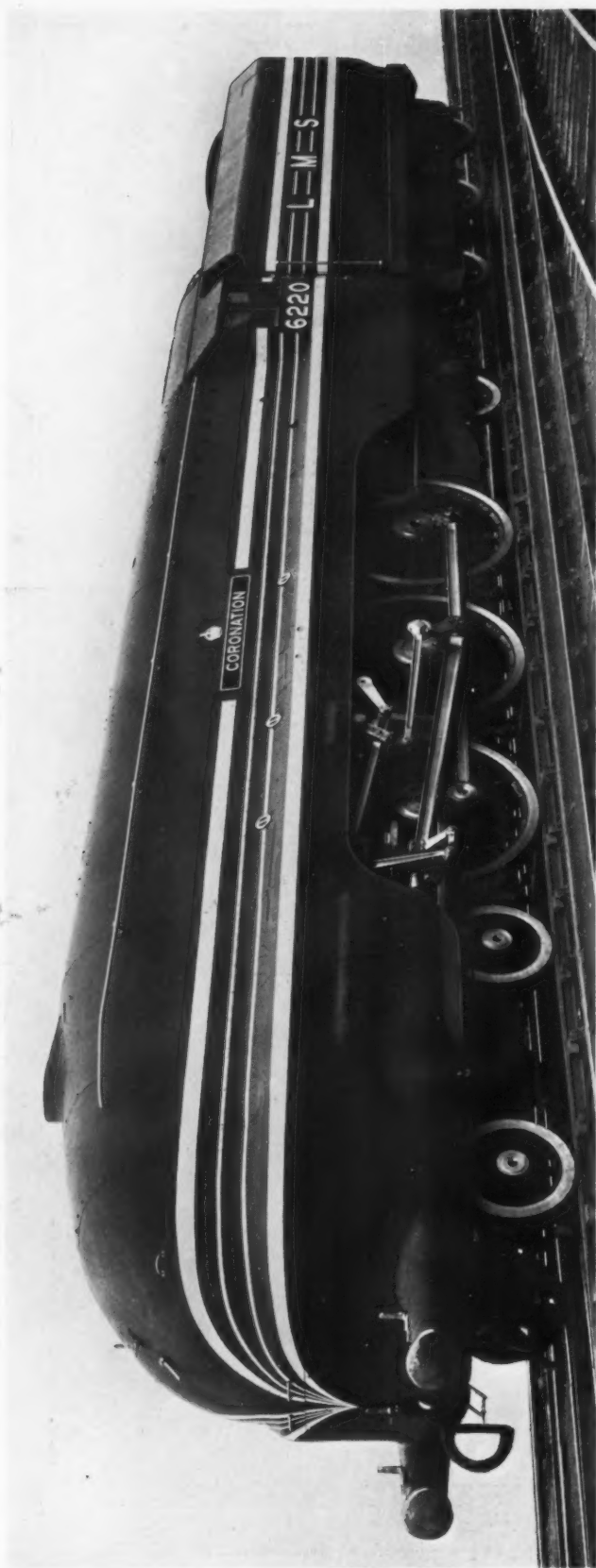


Main frames seen from above

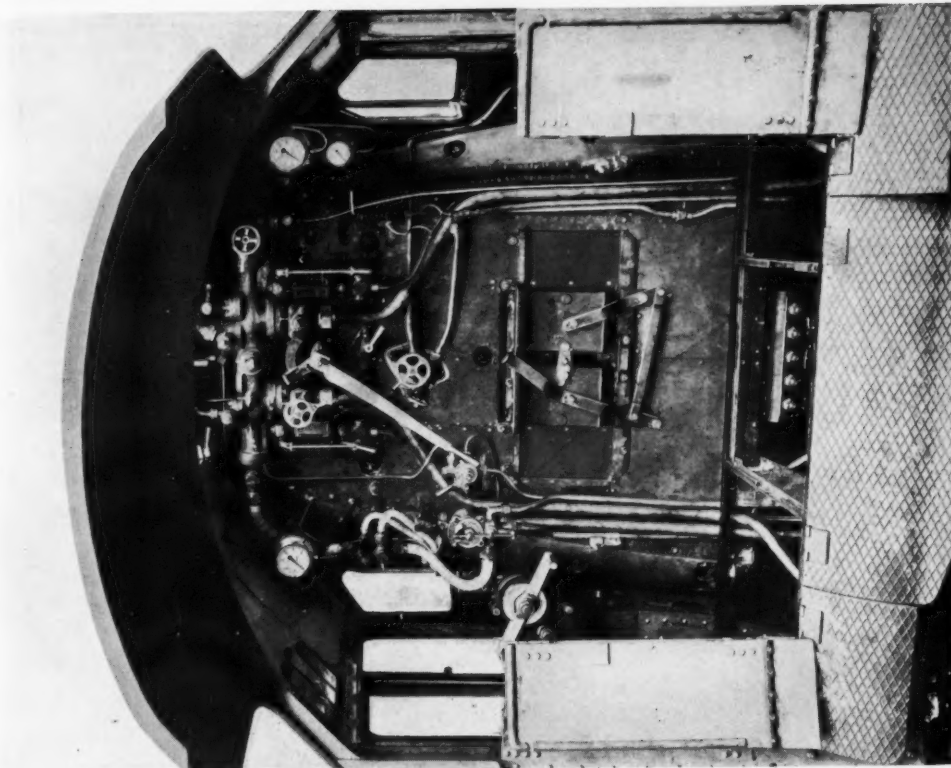


Complete boiler viewed from above

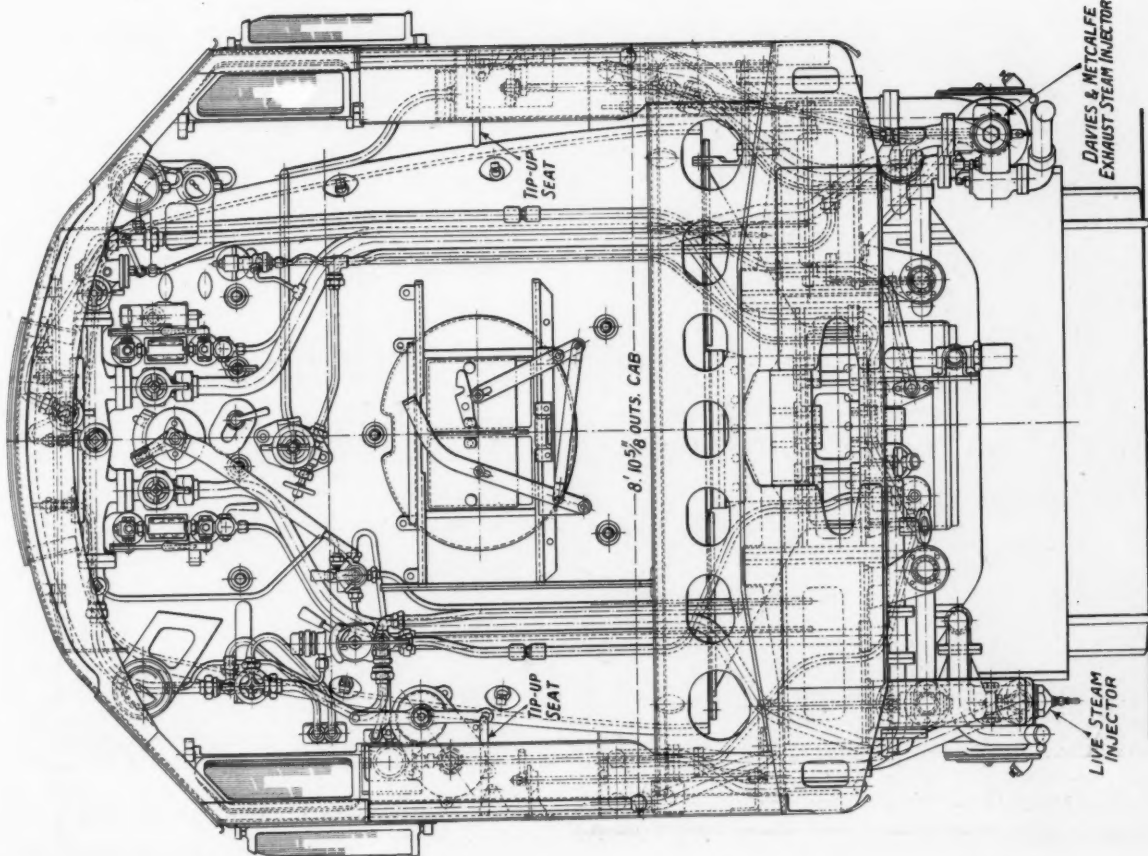
NEW STREAMLINED LOCOMOTIVE, L.M.S.R.



General view of new locomotive and outline diagram

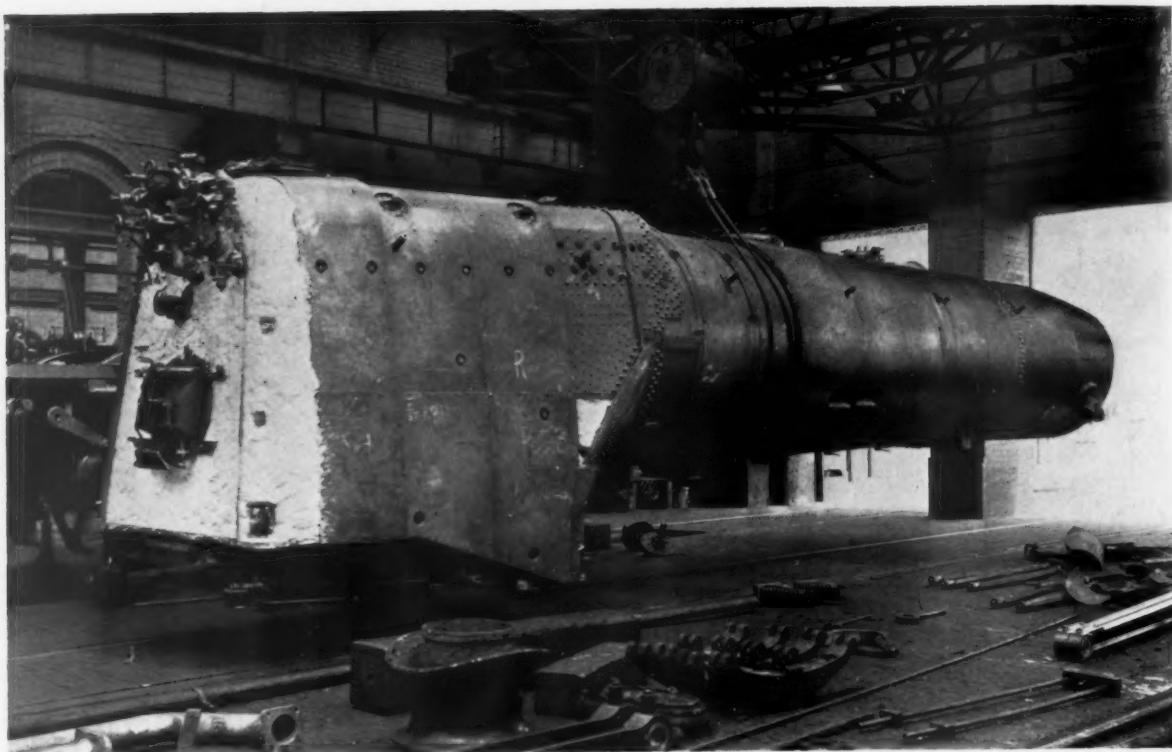


General arrangement drawing and view of cab of new streamlined locomotive, L.M.S.R.

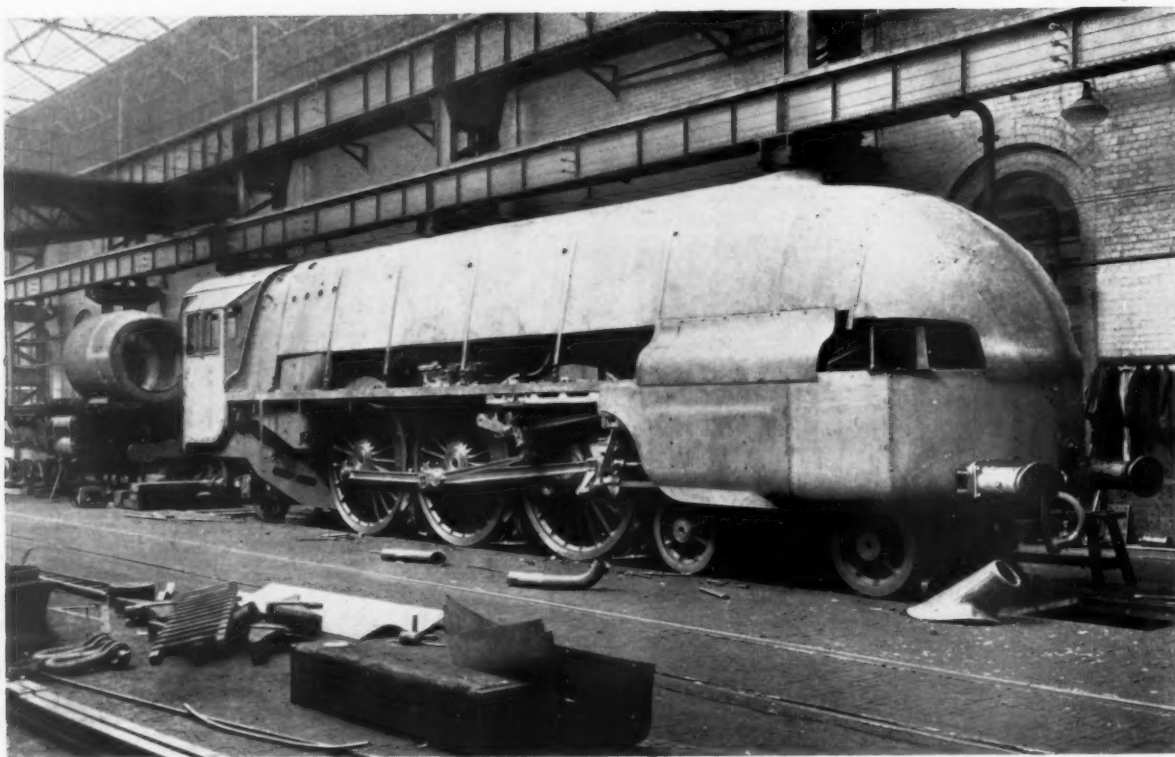


NEW STREAMLINED 4-6-2 LOCOMOTIVE "CORONATION" No. 6220, L.M.S.R.

General view of new locomotive and boiler system

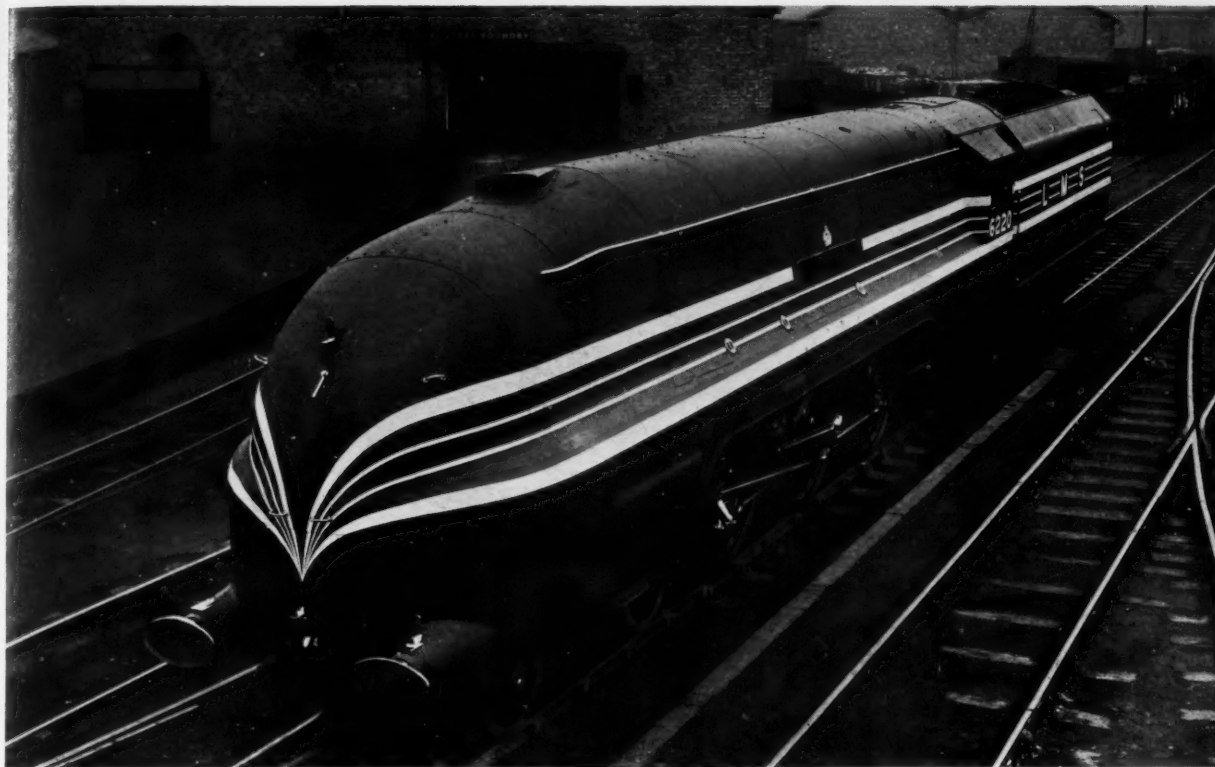


Boiler ready for mounting on frame



In the erecting shop. First engine partly streamlined, with frames and smokebox of second engine behind

NEW STREAMLINED 4-6-2

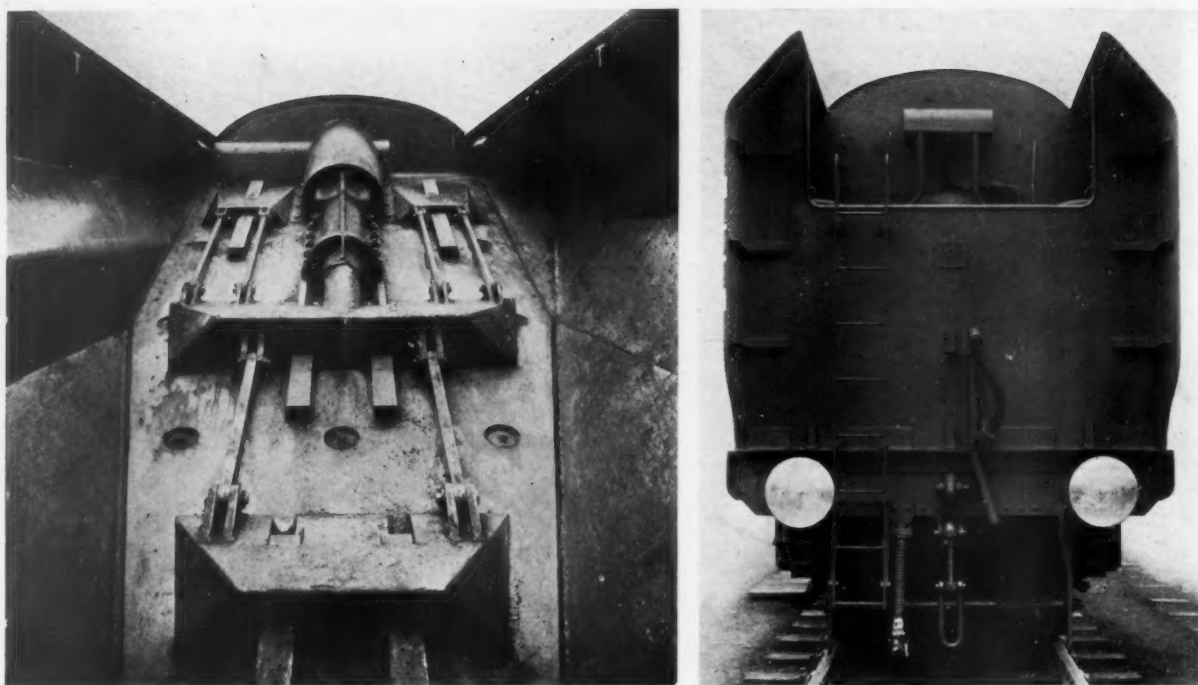


The new streamlined locomotive seen from above

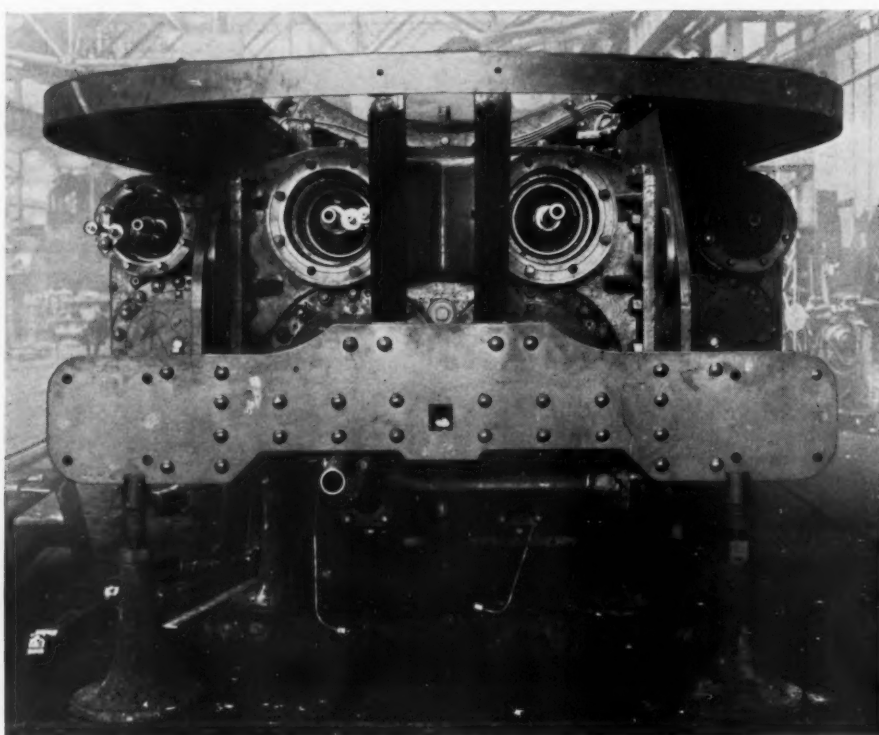


Front views of new L.M.S.R. streamlined locomotive showing, right, the streamlined casing hinged back to expose the smokebox door

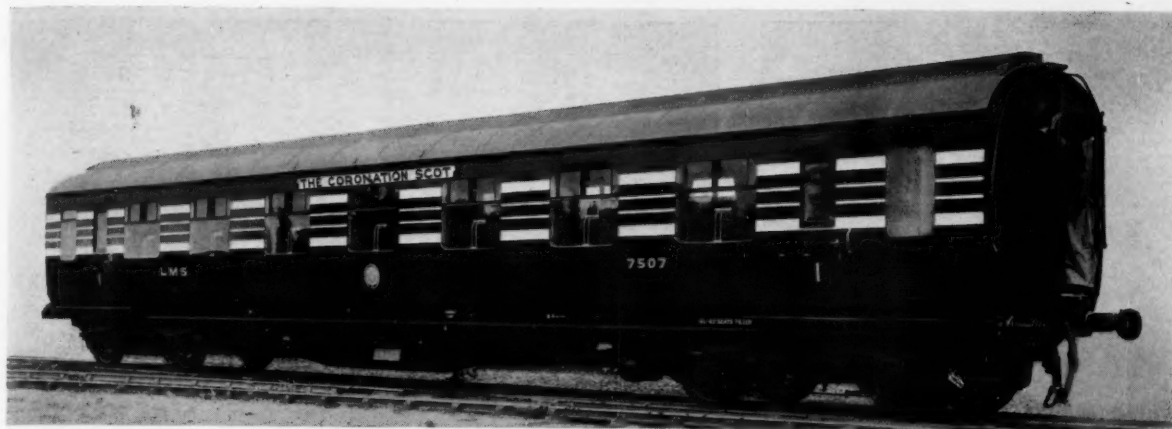
LOCOMOTIVE, L.M.S.R.



Left: Coal pusher inside, and (right) back view of tender of new streamlined locomotive, L.M.S.R.



Front end view showing four cylinders, steam chests, and upper framing

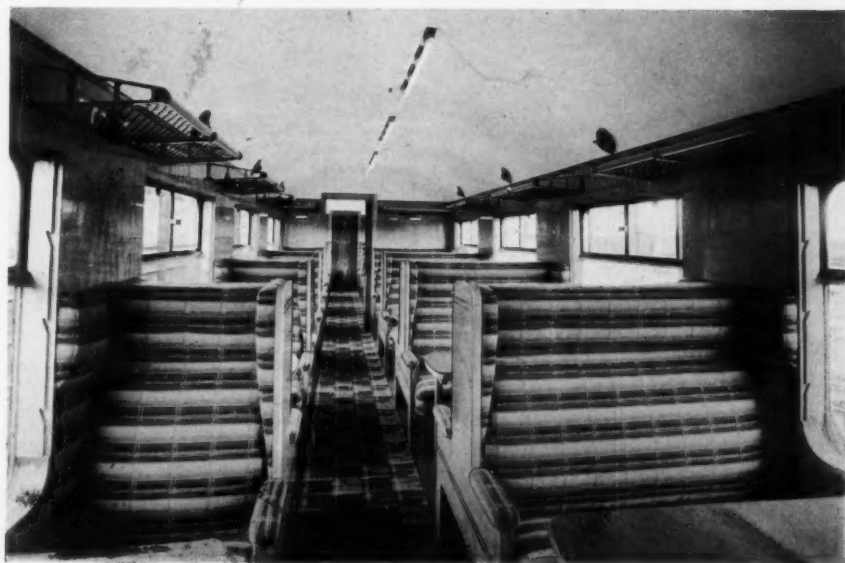


Above: Exterior of first class vestibule diner



Right: Interior of first class vestibule diner

Below: Interior of third class vestibule diner



**NEW ROLLING STOCK
FOR THE CORONATION
SCOT, L.M.S.R.**



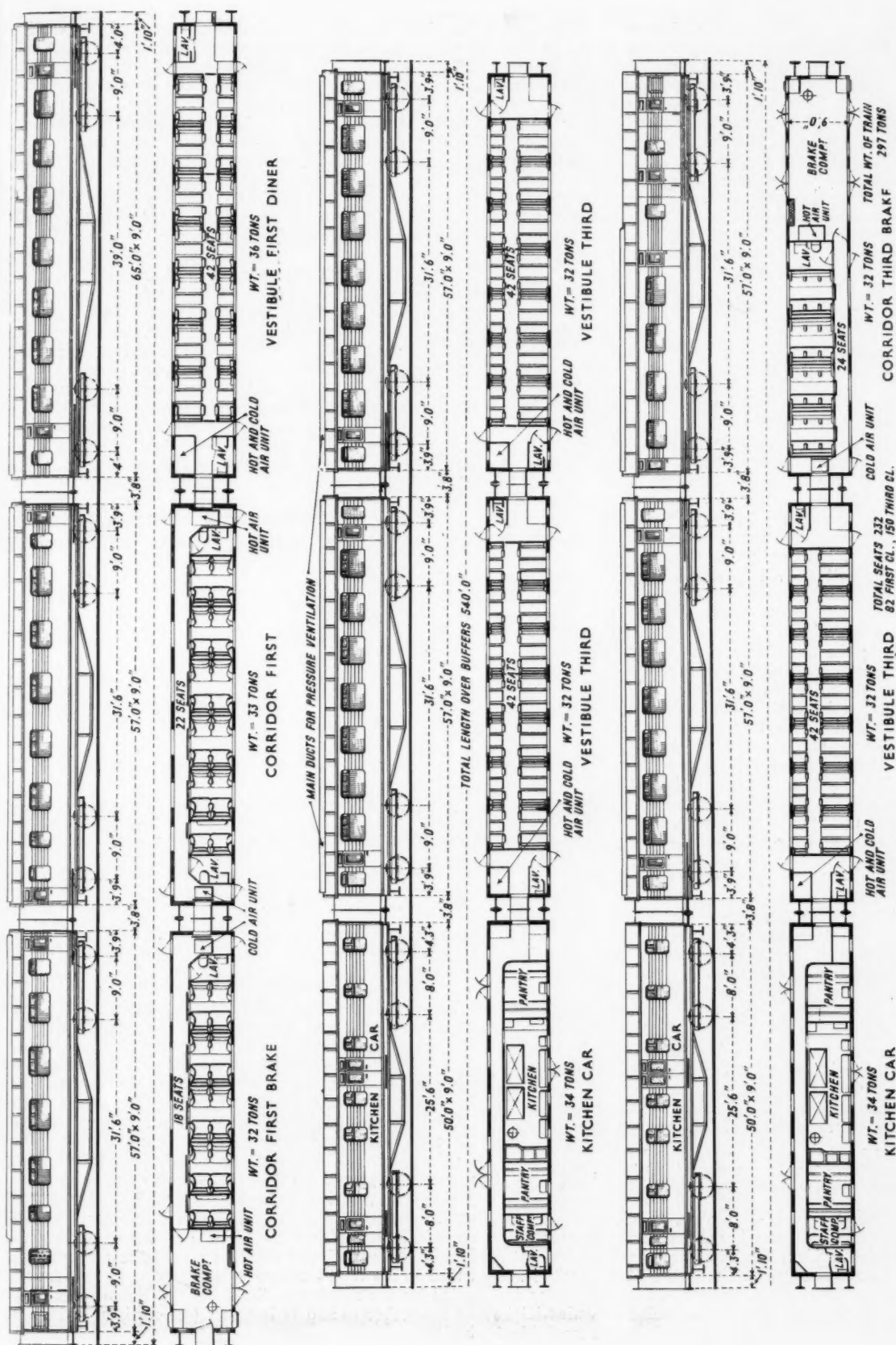
*Above: General view of
the new train*



*Left: Interior of first
class corridor compart-
ment*



*Right: Interior of third
class corridor compart-
ment*



Details of nine-coach make-up of train, showing seating arrangements and weights

finished in chromium plate. The cars are carried on steel underframes with specially selected bogies.

All the vehicles with the exception of the kitchen cars are equipped with pressure heating and ventilation on the Thermo Reg system, the hot and cold systems being isolated in order to ensure the maximum range of temperature control. The air is delivered through nozzles situated above the windows in the vestibule cars, and above the windows and the corridor doors in the corridor cars. These nozzles can be adjusted by the passengers to give any desired temperature. In addition, the usual steam heaters are provided under the seats in every saloon or compartment. Double sliding lights, which can be adjusted to serve either as an extractor or ventilator, are fitted above every window.

Interior Decoration and Lighting

The interior decoration is carried out on modern lines, and as intimated above a flush finish has been obtained throughout the trains, the body-side walls, cornice moulding, and ceiling presenting a very clean appearance which gives a sense of space. All projecting mouldings have been eliminated, but inlaid horizontal bands at cornice height and running through the seat ends are finished in dark contrasting timbers. Different timbers are used in every car, and the first class vestibule dining cars are of different timbers in each train. The furnishings and trimmings are carried out in blue, green and brown, and each train is completed in one colour. The first class trimming material gives a broché effect, and the third class an uncut moquette. Wilton carpets are used in the first class corridor and vestibule cars and the third class vestibule cars, and heavy quality brown cork lino in the third class corridor cars. Curtains are fitted in the first, and blinds in the third class cars to harmonise with the colour scheme of each train.

Every compartment in the corridor first and corridor first brake cars is finished differently, the timbers used being Australian maple butt, Queensland maple, South American Prima-Vera sunray, English olive ash (curly grain) and Australian walnut. The walls of the first class vestibule dining cars are finished in light coloured timbers, and a very striking contrasting effect has been obtained by using darker coloured veneers for the saloon doors. In the first train, the first class dining car walls are covered with a very rich satin wood, and the large flush doors with Claro-Walnut, which is veneered to show a light circle in the centre of the door surrounded by the dark grained timber. The first class vestibule car for the second train is finished in Canadian mountain maple with doors veneered in Nigerian kevazingo. There is a particularly fine waterfall grain in the kevazingo, which is shown off to good effect on the flush panelled doors.

In the first class vestibule for the third train, the contrast between the doors and walls is not so marked, the walls being veneered in English olive ash (straight grain) and the doors in English olive ash (curly grain). The three third class vestibule cars in each train are finished flush with horizontal inlaid bands similar to the first class cars, but each car is finished in different timbers as follows:—

1. English weathered sycamore, and English Burry sycamore.
2. English curly oak butt, and English brown oak with tiger stripe.
3. Canadian silver elm.

The last named veneer was cut from the piles recovered from Waterloo bridge; the piles had been under water from the time the bridge was erected in 1817 until it was demolished in 1936. The corridor third class brakes are finished in South American peroba, with contrasting inlaid horizontal bands of walnut. The metal fittings are finished

satin matt chrome in the first class cars and oxidised Venetian bronze in the third class cars, and the ceilings throughout the trains are covered in cream Rexine.

The electric lighting has been designed to give maximum efficiency, and to harmonise with the general scheme of decoration; in the first class vestibule cars, a continuous tubular strip light is fitted in the ceiling of the saloons. This is supplemented with small tubular architectural lamps above the seats against the cross partitions, and a cylindrical stand lamp on every window sill. One 36-in. tubular strip light is fitted in the ceiling above every set of tables in the third class vestibule dining cars, and architectural lamps are provided above the seat backs on the cross partitions. Candle lamps with independent switches are fitted above every seat in the first class corridor compartments, with an architectural lamp in the ceiling. Shoulder lights are fitted above the seat backs in the third class corridor compartments, with a separate light in the ceiling. Tubular architectural lamps are used throughout in the corridors and lavatories.

The lavatories throughout the trains are finished flush with dark blue Rexine doors and walls up to the window-sills, with silver Rexine above and cream Rexine ceilings. The wash basins are pale blue porcelain with chromium plated taps and metal fittings, and the lavatory floors are laid with blue and white Terazzo Mosaic.

Contractors for Equipment

The following firms are among those which have supplied equipment for the coaches of the new trains:—

Material	Supplier
Decorative woods (see description above)	Aeronautical Panel & Plywood Company; and Laminated Wood Products Limited.
Upholstery and carpets	T. F. Firth & Sons Ltd.
Curtains	Courtaulds Limited.
Rexine	I.C.I. (Rexine) Limited.
Lamps	General Electric Co. Ltd., and London & Provincial Electrical Co. Ltd.
Blue and silver paint for train exterior	Docker Brothers.
Pressure heating and ventilating equipment	Thermotank Limited

Among the contractors for locomotive parts were:—

Material	Supplier
Main frame plates and boiler plates	Colvilles Limited.
Vibrac steel coupling and connecting rods	English Steel Corporation Limited.
Copper firebox plates	I.C.I. Metals Limited; and Thomas Bolton & Sons Ltd.
Monel metal firebox plates	H. Wiggin & Co. Ltd.
Superheater elements	The Superheater Co. Ltd.

Inspection by the Press

The new locomotive and train were inspected at Crewe by representatives of the press on Tuesday last, May 26. Mr. W. A. Stanier welcomed the party at lunch, which was taken at the Crewe Arms Hotel. The inspection was made under the guidance of Mr. E. J. H. Lemon, Vice-President, Railway Traffic Operating and Commercial section. The public will have its first opportunity of travelling in the new trains when they are placed in service on the London—Glasgow 6½-hr. schedule on July 5. The proposal to inaugurate these trains was announced by Sir Josiah Stamp in his speech to the L.M.S.R. shareholders at the company's annual meeting on February 26, and recorded, with editorial comment, in our issue of March 5. It will be remembered that the possibilities of high-speed traffic on the West Coast route had previously been investigated by the running of the London—Glasgow test trains on November 16 and 17 last year (see our issue of November 20).

RAILWAY NEWS SECTION

PERSONAL

Mr. Cuthbert Grasemann has received the insignia of a Chevalier of the Legion of Honour for his services, as Public Relations and Advertising Officer, Southern Railway, to tourism between France and England. (See also editorial note on page 1006).

Mr. H. S. E. Vanderpant has been elected Chairman of the London and Home Counties Traffic Advisory Committee, and an Appointing Trustee to the London Passenger Transport Board.

Mr. F. R. Morgan, M.Inst.C.E., M.I.E., who, as recorded in our issue of April 9, has been granted leave preparatory to retirement from the position of Chief Engineer of the Indian North Western Railway, after nearly 32 years' service, was born in 1882, and was appointed as an Assistant Engineer of Indian State Railways in 1905. Until 1909 he was employed in this capacity on the Nagda—Muttra Railway construction, that section of line now being part of the B.B. & C.I.R. main line between Bombay and Delhi. During the two following years he worked on the Allahabad—Rai Bareilly—Cawnpore construction; he was promoted to Executive Engineer in 1913, and in 1921 was on the Agra—Bah survey and in the following year on the Delhi (N.C.) Railway Works Scheme. It will thus be seen that Mr. Morgan had much survey and construction experience, and on open line maintenance he was employed on four different State systems. In November, 1925, he was appointed to officiate as Deputy Chief Engineer on the North Western Railway, and was confirmed in that grade in 1932. Subsequently he was appointed as a Senior Government Inspector of Railways, and was promoted to officiate as Chief Engineer in June, 1934. During the last three years of his service he has been Chief Engineer, first of the Eastern Bengal and then of the North Western system, whence he now retires.

Mr. G. H. Harrison, C.M.G., M.Inst.C.E., Chairman of the Great Western of Brazil Railway Co. Ltd., is shortly sailing on a visit to Brazil and Argentina. He will spend a fortnight in Pernambuco, where he will have personal discussions with the General Manager, Dr. Manoel Leão.

As was announced in a message from our Paris correspondent last week, M. Raoul Dautry is shortly to retire from the General Managership of the French State Railways, a position he has held since 1928. M. Dautry was born in 1880, and entered the Ecole Polytechnique in 1900. Leaving two years later



M. Raoul Dautry,

General Manager, French State Railways,
1928-1937

with the diploma of engineer, he joined the Northern Railway of France in 1903, as District Engineer at St. Denis, and was closely connected with the widening of the line to Chantilly, and with other works in the Paris area. A visit to America in 1912 preceded work in connection with the repair and manufacture of permanent way materials and signals. For his war service, mainly concerned with permanent way construction and maintenance, M. Dautry received the Legion of Honour on the field, from M. Clemenceau and Marshal Foch. After the war, as Chief Permanent Way Engineer of the Nord, he was largely responsible for the reconstruction of the lines in the devastated areas, and it was due to his energy and enterprise that the permanent way on that system was brought up to a standard second to none. After the armis-

tice, he rebuilt 8 viaducts, 811 bridges, 5 tunnels, and 338 stations in 10 months. The garden cities in connection with the Nord system, totalling 12,000 houses, are a lasting memorial to him. In November, 1928, he was appointed General Manager of the French State Railways, which he completely reorganised and brought to their present condition of efficiency. From 1931 to 1932 inclusive, while still carrying on his railway duties, he was President of the Compagnie Générale Transatlantique, the well-known French Line, and in 1931 he was President of the Aéropostale. He also collaborated with the Franco-German economic commission, and presided over the commission of public relief works (Marquet Plan). In 1934 he was elected President of the French Railway General Managers' Conference, and has taken a leading part in drafting plans for rail and road co-ordination. In 1935 M. Dautry was among those appointed by the Premier, M. Laval, to be his personal advisers on financial matters. (See also editorial note on page 1005).

Mr. E. J. Woolley has been elected Chairman of the Grand Union Canal Company, in succession to Mr. W. H. Curtis, who retired on April 30. Mr. John Miller has been elected Chairman of the Executive Committee of Management.

Sir Cyril Hurcomb, Permanent Secretary to the Ministry of Transport, and President of the Institute of Transport in 1935-36, has been appointed an Electricity Commissioner, and on the retirement of Sir John Snell at the end of the year will succeed him as Chairman of the Electricity Commission. Sir Cyril Hurcomb fills the vacancy caused by the death of Sir John Brooke, recorded in our issue of April 9.

Mr. R. Hunter, whose appointment as District Goods and Passenger Manager for the newly formed Motherwell District of the L.M.S.R. was recorded in our issue of April 2, joined the Caledonian Railway as Passenger Clerk at Law Junction in October, 1900. After three years he was transferred to Wishaw Goods Station and in 1907 was appointed to the staff of the General Goods Manager at Glasgow. Later, he served on the staffs of the Outdoor Goods Manager, the Western District

Goods Manager, and the Chief Goods Manager of the Caledonian. Mr. Hunter became Chief Clerk in the office of the Edinburgh District Traffic Superintendent in October, 1922, and was appointed Goods Agent at Edinburgh,

Mr. Spendlove was in 1909 appointed to the Northern District of the Midland Railway, with headquarters at Skipton, where he was in charge of electrical signalling and telegraph equipment; the 6,600-V. a.c. single phase

pointed Assistant to Mr. W. R. Jones, the Divisional Signal Engineer, Hunts Bank, Manchester. As from May 26 he has succeeded Mr. Jones in that position. Mr. Spendlove is an Associate Member of the Institution of Electrical



Mr. R. Hunter,

Appointed District Goods & Passenger Manager, Motherwell, L.M.S.R.

L.M.S.R., in November, 1928, which position he has now vacated.

Mr. S. W. Spendlove, whose appointment as Divisional Signal & Telegraph Engineer, Hunts Bank, Manchester, L.M.S.R., was announced in our issue of May 14, began his railway career at Derby in the Telegraph Department of the former Midland Railway. After some three years on the line at various stations, he was transferred to the headquarters staff at Derby, there gaining experience in engineering work for about seven years.



[Photo]

[Lafayette]

Mr. S. W. Spendlove,

Appointed Divisional Signal and Telegraph Engineer, Hunts Bank, Manchester, L.M.S.R.

electric traction line, Heysham; and the company's wireless transmitting station at Heysham Harbour, together with the wireless equipment on the Heysham-Belfast steamers. After the formation of the L.M.S.R. group, Mr. Spendlove was in 1926 appointed to the new district at Lancaster, embracing sections of the former London & North Western, Lancashire & Yorkshire, Midland, and Furness Railways. When, in 1929, a combined Signal and Telegraph Engineer's Department was created on the L.M.S.R., under Mr. A. F. Bound, Mr. Spendlove was ap-



The late Mr. Magnus Volk.

A pioneer of electric traction, 1851-1937

Engineers, and a Member of the Institution of Railway Signal Engineers.

It is with regret that we record the death on May 20 of Mr. Magnus Volk, the well-known pioneer of electric traction. He was born at Brighton on October 19, 1851, and was therefore in his 86th year. From his early years he took a keen interest in the possibilities of electricity and proved a versatile inventor. He obtained a gold medal in December, 1881, for a street fire-alarm system very similar to that still in use, and in the following year as



Mr. M. J. Ginnetty,

Appointed Running Superintendent, Great Southern Railways, Ireland



Mr. W. A. McNab,

Appointed Assistant Running Superintendent, Inchicore, Great Southern Railways



Mr. C. F. Tyndall,

Appointed District Locomotive Superintendent, Waterford, Great Southern Railways

Engineer to the Telephone Co. Ltd. he introduced the telephone to Brighton. Mr. Volk became Electrical Engineer to the Brighton Corporation and in April, 1883, lighted the whole of the Brighton Pavilion, an installation which was then the largest electric lighting enterprise in the country. The work for which he is best known, however, is the famous electric railway on the beach at Brighton. The first section, extending from a point opposite the entrance of the old Aquarium to the Chain Pier, was opened on August 3, 1883, by the Mayor of Brighton; it was the pioneer electric line in Great Britain. In 1887 Mr. Volk constructed an electric dogcart which attracted considerable attention not only in the press of this country but also in Germany, the birthplace of electric traction. As a result Mr. Volk received an order from the Sultan of Turkey for an electric car, which was claimed to be the first export order for a motorcar given to this country. Even in his later years Mr. Volk continued to lead an extraordinarily active life; he was a freemason, a rotarian, and Vice-President and a Life Governor of the Royal Alexandra Hospital for Sick Children, Brighton. Further reference to Mr. Volk's pioneer work is made in our *Electric Railway Traction Supplement* this week.

Mr. William Whitelaw, Chairman of the London & North Eastern Railway, was on May 21 presented at Edinburgh with a portrait of himself painted by Mr. W. R. Brealey, in recognition of his services to the Church of Scotland.

The late Lt.-Col. Arthur Mowbray Berkeley, C.I.E., V.D., Chief Engineer of the Assam-Bengal Railway from 1906-1914, left estate valued at £29,468 (£19,724 net). Lt.-Col. Berkeley died on March 23, as recorded in our issue of April 2.

Mr. M. J. Ginnetty, who as announced in THE RAILWAY GAZETTE of April 2 has been appointed Running Superintendent, Great Southern Railways, Ireland, served his apprenticeship in the Great Northern Railway works at Dundalk, and gained several distinctions at the science schools attached to the works and at the technical institute. On completion of his training he was appointed to the drawing office, after which he was placed in charge of the machine shops, later being transferred to the Running Department and subsequently returning to the drawing office as Chief Assistant. In 1911, Mr. Ginnetty joined the service of the former Midland Great Western Railway as Chief Draughtsman at the Broadstone locomotive, carriage and wagon works, afterwards becoming Works Manager, and on the resignation of Mr. D. C. Urie in 1922 succeeded him as Running Superintendent. On the amalgamation of the Free State Railways, Mr. Ginnetty became District Superintendent in Dub-

lin, and acted in addition as Deputy for the Running Superintendent of the entire system. It was in 1932 that his designation was changed to Running Assistant to the Chief Mechanical Engineer, the position from which he is now promoted to be Running Superintendent.

Mr. W. A. McNab, who, as recorded in our issue of April 2, has been appointed Assistant Running Superintendent of the entire system of the Great Southern Railways, Ireland, at Inchicore, joined the Great Southern & Western Railway as a premium apprentice at Inchicore, and passed through the various shops and offices. In 1914 he was appointed Junior Assistant to the Running Superintendent, and in 1915 he became Locomotive Foreman at Kildare. He was appointed Works Manager at Limerick in 1921. In 1925, following amalgamation of the Free State railways, he became District Locomotive Superintendent at Athlone, and in 1929 was promoted to Waterford, which position he retained until his present appointment.

Mr. C. F. Tyndall, who, as recorded in our issue of April 2, has been appointed District Locomotive Superintendent at Waterford, Great Southern Railways, Ireland, *vice* Mr. McNab, was educated at Castleknock College, and Earlsfort House School, Dublin. He began his training with the former Great Southern & Western Railway, in 1916, and after five years in the various workshops, drawing office, and laboratory at Inchicore, was appointed Junior Assistant in the Inchicore works. On amalgamation of the Free State railways, Mr. Tyndall was appointed Assistant to the Running Superintendent of the Great Southern Railways, and in 1929 Assistant to the District Locomotive Superintendent at Cork, which position he retained until his present promotion. Mr. Tyndall has acted as Inspector of Purchased Materials on various occasions for several years past.

We regret to record the death on May 21, at Southport, of Mr. G. W. Winterbottom, O.B.E., who was Steamship Manager (East Coast), London Midland & Scottish Railway, from 1923 until his retirement in the following year. Mr. Winterbottom entered the service of the former Lancashire & Yorkshire Railway in 1875, at Bury Goods station. In 1878 he was transferred to Manchester as Junior Clerk in the office of the Chief Traffic Manager, remaining there until appointed to the Chief Engineer's office some years later. For sixteen years he occupied the position of Chief Clerk to the Chief Civil Engineer of the L. & Y.R. His connection with the shipping side of the company's business began in 1905, when, powers having been obtained for the running of steamers to the Continent, he was appointed Assistant Steamship Manager at Goole on

the acquisition by the L. & Y.R. of the old Goole Steam Shipping Company's business. Mr. Winterbottom was appointed Steamship Manager in 1908, and in the same year was elected as one of the three Goole shipowners on the Humber Conservancy Board. After the formation of the L.M.S.R. group, he was, in January, 1923, appointed Steamship Manager (East Coast), and retired in January of the following year.

The late Sir John Brooke, Deputy Chairman of the Electricity Commission, whose death on April 1 was recorded in our issue of April 9, left estate valued at £9,174 (£5,215 net).

Mr. George Lathan, J.P., M.P., is retiring from the post of Chief Assistant Secretary of the Railway Clerks' Association, which he has occupied for 25 years.

Mr. A. J. Brickwell, C.B.E., late Estate and Rating Surveyor, London & North Eastern Railway, has organised in aid of the funds of the Victoria Cottage Hospital Extension, Barnet; the East Barnet Nursing Association; and railway staff charities; an exhibition at the goods depot, New Barnet station, of the latest locomotives, passenger, goods, and other rolling stock of the London & North Eastern Railway. Mr. William Whitelaw, Chairman of the company, will preside at the opening ceremony by Sir Philip Sassoon, on Saturday, June 5.

We record with regret the death of Mr. John D. Rockefeller, who died on May 23 at the age of 97. Although his name is not primarily associated with transport undertakings, and, indeed, for many years past has been connected in the general mind rather with his philanthropic than his commercial ventures, Mr. Rockefeller was not without his influence upon railway history in the United States owing to his large shareholdings in the railway companies. In their turn, the railways had their effect upon the Rockefeller enterprises. It was after they had decided to abandon the preferential rates originally conceded to the Standard Oil Company that Mr. Rockefeller founded his Central Association, which took nearly all the oil refiners in the country under its control. This step led in 1882 to the formation of the Standard Oil Trust.

It is with regret we record the death of Mr. William Beehmer Harding Green, in London on March 19, at the age of 86, who was for many years General Manager of the Bahia Blanca Division of the Buenos Ayres & Pacific Railway, now incorporated in the B.A.G.S. system. Though born in New York, he was educated at Winchester and the Crystal Palace School of Engineering. From 1878 to 1883 he was in the service of the Central Uruguay Railway at Monte-

video, and from 1884 to 1890 was engaged as Chief Mechanical Engineer on the construction of the system of narrow-gauge railways in the Province of Santa Fé, Argentina. In 1890 he was appointed General Manager and Resident Engineer of the Bahia Blanca & North-Western Railway, and in 1906 became General Manager of the Bahia Blanca Division of the Pacific Railway, retaining this position until his retirement about 20 years ago.

The Duke of Abercorn, and Mr. A. E. Hadley, have been appointed Directors of the Rhodesia Railways Trust as from May 25.

We regret to record the death of Mr. John Thomas Morkill, formerly Chief Engineer of the Quebec Central Railway. Mr. Morkill died at Sherbrooke, Canada, at the age of 81.

We regret to record the death at Brompton Hospital on May 22 of Lt.-Col. John Archibald Polwhele, O.B.E., M.Inst.C.E., Manager and Engineer-in-Chief of the Bengal Dooars Railway. Col. Polwhele, who was aged 86, received the O.B.E. (Military Division) in the New Year's Honours this year, as recorded in THE RAILWAY GAZETTE of February 5.

Sir Mohammad Zafrulla Khan, Hon. Member for Railways and Commerce in the Viceroy's Executive Council, India, received the K.C.S.I. in the Coronation honours list. A knighthood was conferred upon Mr. T. H. Elderton, Chairman of the Calcutta Port Trust.

Forthcoming Events

- May 28 (Fri.).—Indian State Railways, at East India United Service Club, 16, St. James's Square, London, S.W.1, 7 for 7.30 p.m. Annual Dinner.
- May 29 (Sat.).—Institution of Railway Signal Engineers. Visit to Power Signalling Installation, Waterloo Station, S.R., at 2.0 p.m., followed by Supper and Concert, Court Restaurant, Hampton Court, 7.30 p.m.
- Stephenson Locomotive Society (London). Visit to Nine Elms Shed, Southern Railway.
- May 31—June 11.—International Railway Congress, in Paris.
- June 3 (Thurs.).—Railway Club, at Royal Scottish Corporation Hall, Fetter Lane, London, E.C.4. 7.30 p.m. "Railway-Owned Steamers on the Clyde," by Mr. L. H. Bailey.
- June 9 (Wed.).—Diesel Engine Users' Association, at Crewe. Summer Meeting.
- June 9-12.—Tramways, Light Railways and Transport Association, at North British Station Hotel, Edinburgh. Annual Congress.
- June 10 (Thurs.).—Exide Service Convention, at Hotel Metropole, Folkestone.
- June 12 (Sat.).—Permanent Way Institution (Manchester-Liverpool), at Temperance Inst., London Street, Southport, 3 p.m. "Brickwork and Concrete," by Mr. J. Wolstencroft.
- June 14 (Mon.).—Institution of Mechanical Engineers, in Leicester. Summer Meeting.
- June 17-21.—Stephenson Locomotive Society. Summer Tour in Scotland.
- June 26-July 11.—Institute of Transport, in Germany. Congress.
- July 2-9.—Permanent Way Institution (Manchester-Liverpool). Summer Convention.
- July 3 (Sat.).—Stephenson Locomotive Society (London). Visit to Bedford, Wellingborough and Kettering Sheds, L.M.S.R.

Paris Metro Fare Increases

(From our Paris correspondent)

The Paris Metro this year will have a deficit estimated at fr. 300,000,000. This is due to rising labour costs involved by the application of the new social laws, especially the 40-hr. working week, the increased costs of materials, and the heavy expenditure on the extension of the system into the suburbs. Proposals for increases in fares to cover part of this deficit have for some time past been under consideration by the Paris Municipal Council. The taxpayers will also be called upon for additional contributions to aid in meeting the deficit.

It was proposed to raise the price of the second class ticket from 70 to 90 cm., and the first class from fr. 1.15 to fr. 1.40. But the Municipal Council would not vote the full increase unless the General Council of the Seine Department at the same time agreed to a proportional rise in bus fares in the Paris area. The latter body has constantly refused to accept this proposal, presumably on political grounds, as the Front Populaire, or Government Party, has a majority on the General Council and apparently wanted to throw the onus of any increase on the Municipal Council.

After a long deadlock in the negotiations between the two bodies, the Municipal Council has now decided to increase the Metro fares in two stages. The second class fare will be raised immediately to 80 cm., and the first class to fr. 1.30, but as soon as the General Council consents to raise the bus fares, the full rise of 90 cm. and fr. 1.40 respectively will come into force automatically on the Metro lines. Return tickets, issued before 9 a.m., will cost fr. 2 first class and fr. 1.15 second class, while collective tickets for parties of school children, single journey, will cost 15 cm. The initial rise in the Metro fares is estimated to bring in fr. 75,000,000 a year, instead of fr. 145,000,000 as was expected from the full tariff. Since the rise was voted, it has been found that legal formalities may prevent it coming into force until June 10.

Unless the bus fares are increased, the Metro lines are likely to lose traffic, as passengers will prefer to travel by the buses in many cases. Action has been taken by the Metro on pressure from higher administrative quarters indicating the need of an improvement in the financial situation before further suburban extensions are undertaken. It has also been pointed out that unemployment has a direct influence on the Metro traffic receipts. Further, it is estimated that the decrease in the purchasing power of the population has caused about 70,000,000 passengers annually to abandon the Metro, while the proportion travelling first class has declined from 12.36 per cent. in 1929 to 5.7 per cent. in 1936. The trade depression is causing the Metro to lose

about fr. 100,000,000 a year in traffic receipts, while the number of passengers has fallen by about 140,000,000. Application of the 40-hr. working week involves the addition of 2,300 employees to the Metro working staff. No mention is made in the official documents of the effect of the closing of the banks on Saturdays and of numerous other businesses on Saturdays or Mondays, as an outcome of the 40-hr. week. There can be little doubt that such closing will bring further losses to the Metro traffic.

THE LONDON TILBURY & SOUTHEAST RAILWAY.—At the monthly meeting of The Railway Club on Thursday, May 6, at the Royal Scottish Corporation Hall, Fetter Lane, E.C.4, Mr. N. McCracken, M.C., gave an interesting lantern lecture on the London Tilbury & Southend Railway. Tracing the history from the incorporation in 1852 by the Eastern Counties and London & Blackwall Railways, for a joint line from Forest Gate junction to Tilbury, and Southend, with the object of obtaining some of the valuable river traffic to Gravesend and Southend, the lecturer described with the aid of a diagram the opening of the various sections, including the direct line via Upminster, which was built more with the idea of relieving the Tilbury line of the expected heavy traffic to the new docks, than as a direct line to Southend. Mr. McCracken also referred to the growth of independence and the antagonism with the Great Eastern Railway. In conclusion, an interesting series of lantern slides was shown.

L.N.E.R. TRAIN CINEMA TWO YEARS OLD.—The first permanent railway cinema coach in this country had its second birthday yesterday (May 27). It will be remembered that, after experiments spread over several years, Pathé and the L.N.E.R. jointly equipped a railway coach as a cinema theatre in May, 1935, and the first performance was given on the 27th of that month. The coach is attached to the 10.10 a.m. train from King's Cross to Leeds and the 3.15 p.m. from Leeds to King's Cross on weekdays, and to excursion trains on Sundays. Six one-hour performances are given daily. The coach has now made more than 1,200 journeys and covered a quarter of a million miles; approximately 60,000 people have seen the programmes. The success of this venture led to a second coach being introduced in March of last year, and this is now in regular service between King's Cross and Doncaster. Sound films, mostly of a tropical nature, are shown in the coaches, which are insulated to exclude as much outside noise as possible. This week's programme included scenes of the Coronation in Westminster Abbey and pictures of the visit of Their Majesties to the City.

Ancillary Businesses of British Railways in 1936

V—Canals

Of all the ancillary businesses of the British railways, the canals must be accounted the least satisfactory. For the most part, these waterways constitute an unwelcome burden imposing financial loss upon the railway companies responsible for their upkeep. The loss has been considerably reduced in recent years but it will be seen from the following table that 1936 witnessed a continuance of the dismal record of financial failure:—

	Gross receipts		Expenditure		Loss	
	1936	1935	1936	1935	1936	1935
G.W.R. ...	£14,256	£13,894	£31,346	£32,604	£17,090	£18,710
L.N.E.R. ...	36,203	37,067	49,456	51,203	13,253	14,136
L.M.S.R. ...	118,449	117,740	137,753	134,722	19,304	16,982
S.R. ...	1,799	1,890	883	1,515	916	375
					Profit	

The G.W.R. secured a small increase of £362 in receipts, which, together with a decrease of £1,258 in expenditure, chiefly in respect of reduced liabilities for rates and rate relief fund, resulted in a reduction of £1,620 in the net loss. L.N.E.R. receipts declined by £864, but here again there was a reduction of £1,747 in expenditure, due entirely to the revision of rates and rate relief, and the net loss was £883 less than in 1935. There was an increase of £709 in the receipts from L.M.S.R. canals, but expenditure rose by £23,031 due to increased cost of maintenance, and the net loss was therefore £2,322 greater than in 1935. The Southern Railway is in the fortunate position of being able to make a profit on the one short length of canal which it owns, i.e., the Gravesend and Higham, 4½ miles long. The receipts last year showed a slight decrease of £91, but expenditure fell by £632 due to a reduction in the cost of maintenance, with the result that the net profit of £916 was £541 more than in 1935.

It is difficult to believe that many of the railway-owned canals were once exceedingly prosperous concerns, responsible for the conveyance of large quantities of traffic and able to pay high dividends. In 1824, for instance, the value of a £75 share in the Trent & Mersey Canal was no less than £2,200; £12 10s. invested in the Birmingham Canal was worth £350; and even a £1 share in the Kennet & Avon Canal was priced at £29. On the other hand, some of these waterways never fulfilled the high hopes of their promoters and occasioned serious losses to investors. Some of them had, in fact, already drifted into a serious condition at the time of their purchase by the railways, and their continued operation today, despite financial loss, is due entirely to the fact that they are railway-owned. Private enterprise would never

have attempted the task of maintaining them in working order.

In many instances, the railways were almost blackmailed into buying canals which they had not the slightest desire to possess, by the threat of opposition to their Bills. It is easy to be wise after the event, but, viewing the position in the light of reason and divorced from the feverish anxiety which marked the railway mania of the late 'forties, it would appear that the companies

would have been better advised to have fought the issue out at the time instead of burdening themselves with hundreds of miles of unremunerative waterways. It is to the credit of the railways that, having acquired the canals, they have, generally speaking, maintained them in good order and repair.

The cost of canal maintenance can be very heavy, especially in industrial areas, or in districts where there are colliery workings and consequent risk of subsidences. The Birmingham Canal, controlled by the L.M.S.R. under a complicated arrangement entered into between the London & Birmingham Railway and the canal company in 1846, affords a good example of this type of waterway. For a distance of about eighty miles through the industrial Midlands this canal has been undermined by colliery workings, and is now carried on embankments raised from time to time to maintain it above the level of the ground where the presence of mines has led to subsidences.

The question of canal maintenance is of particular interest at the present time in view of the fact that the L.M.S.R. is seeking authority from the Minister of Transport to abandon portions of three of its canals, namely, the Manchester, Bolton & Bury, the Shropshire Union (Welsh Section) and the Cromford Canal. With regard to the Manchester, Bolton & Bury Canal, in the days when this canal was owned by the Lancashire & Yorkshire Railway, it was literally wrecked by coal workings, with the result that the railway company had to spend an enormous sum of money in law suits and the restoration of the waterway. Last year two serious breaches occurred in the canal embankment, and the cost of repairing the damage is estimated at just under £100,000. In view of the unsatisfactory financial position of the

canal and the improbability of any material improvement in the future, the L.M.S.R. naturally considers this heavy expenditure unwarranted. It is therefore proposed that certain portions of the canal, totalling 10½ miles, should be abandoned.

Similarly, a breach occurred last year in the bank of the Welsh section of the Shropshire Union Canal near Frankton, Salop. This left the canal without water for a distance of more than a mile, and severed the remainder of the Welsh section from the main system. Here again, the cost of repairing the breach would be very considerable, and authority is therefore being sought to abandon the Welsh section from its terminus at Newtown, Montgomeryshire, to Frankton, a distance of 36½ miles.

The Cromford Canal, which passes through the Nottinghamshire coalfield, has had a somewhat troubled history, and the principal danger point has been Butterley tunnel, 3,063 yds. long. This tunnel has been repeatedly injured through subsidences, and occasioned great expense to the Midland Railway. From 1889 to 1893 it was closed altogether for repairs, and in 1900 there was another serious subsidence which blocked the tunnel completely. The sections to the east and west of the tunnel have been maintained for public navigation up to the present time, but there has been a substantial decrease in traffic on the western section since 1906, and the L.M.S.R. is therefore seeking relief from the obligation to maintain this section as a navigable canal for the 8½ miles from Cromford to the westerly end of the tunnel.

The L.N.E.R. is also seeking relief from part of its canal burden. The company's Bill, which was approved at the last special general meeting of shareholders, provides for confirmation of the lease to the Trent Navigation Company of part of the Nottingham Canal, and release from statutory obligations to cater for navigation on the remainder of the canal. For many years the traffic upon this waterway was negligible and has now ceased altogether. There are undoubtedly numerous other sections of the 996 miles of railway-owned canals which might well be abandoned. On many of them the traffic has fallen to extremely low levels, and the loss of the limited facilities which they afford would be no serious matter.

SIR JOSIAH STAMP OPENS NEW YORK OFFICE OF BRITISH RAILWAYS.—Sir Josiah Stamp, President of Associated British and Irish Railways, Inc., of New York, this week inaugurated its new offices in Rockefeller Plaza by presiding over a luncheon at the Gotham Hotel to some 200 guests representing all branches of trade and commerce. He welcomed the increase in intercourse between the two countries, and said it was one of the most stabilising influences at work in the present disturbed situation.

STAFF AND LABOUR MATTERS

Rail Wage Claims

Important meetings are to take place in London today (Friday) in regard to the wage claims preferred by the trade unions to the four main-line railway companies. Representatives of the companies will meet the leaders and members of the executive committees of the three railway trade unions this morning to give the reply of the companies to the various items which were first discussed on April 29.

The unions are seeking, not only the termination of the "economy cuts" awarded to the companies by the National Wages Board in March, 1931, but also substantial improvements in wages and conditions. The National Union of Railwaymen has asked for a minimum wage of 50s. a week for all adults; the Associated Society of Locomotive Engineers and Firemen has submitted a lengthy programme, including a request for increased holidays with pay for enginemens; and the Railway Clerks' Association wants, for salaried staff, a 36-hour working week, extra pay for work performed between 6.0 p.m. and 6.0 a.m., and pay increases for staff for whom promotion is not available. No official estimate has yet been given of the total sum involved in the claims, but it is certain to amount to many millions.

This afternoon another meeting of the National Railway Shopmen's Council will be held when the council will give further consideration to the application made by the numerous trade union parties to the agreed machinery of negotiation for railway shopmen. The unions seek the termination of the deduction of 1½ per cent. from earnings, twelve days holiday with pay; a guaranteed day and a guaranteed week; an increase of a penny an hour; consolidation of the war wage and base rates; and a minimum wage of 50s. a week.

Retirement of Mr. George Lathan

Mr. George Lathan, J.P., M.P., who has been Chief Assistant Secretary of the Railway Clerks' Association for twenty-five years is retiring from that position and will carry with him the good wishes, not only of members of his Association, but of the staff officers of the Railway Companies with whom he has been in contact during the conduct of his official duties. He was a member of the British Railways National Wages Board during the whole of its existence, and also of the National Wages Board in Ireland, where he has undertaken wage negotiations for many years.

Mr. Lathan, who was President of the Railway Clerks' Association in 1908 and Chairman of the Labour Party in 1931/1932, is Labour Member for the Park Division of Sheffield.

A.S.L.E.F. Annual Meeting

The annual assembly of delegates of the Associated Society of Locomotive

Engineers and Firemen will begin its deliberations in London on Monday next, May 31. Mr. W. J. R. Squance, the General Secretary, who has been on a visit to Russia, is expected.

Railway Clerks' Association Conference

The annual conference of the Railway Clerks' Association opened at Swansea on Monday last, May 24. In his presidential address, Mr. F. B. Simpson, M.P., said he welcomed the news of the companies' application to the Railway Rates Tribunal to increase railway rates and charges; he thought that this action, coupled with existing tendencies, should make his association's wages claims "easy of achievement." Mr. Simpson considered that "railway economics are clamped down to excessive and ancient capital commitments," and went on to say that, in the interests of transport workers and transport users alike, he believed "no adequate solution of our difficulties and needs can be found, short of national ownership or control of a co-ordinated transport service." Mr. Simpson said that, whereas at the end of 1931 the association had 59,158 members, the membership today numbered 62,000.

At the session on Tuesday Mr. Stott, in referring to the wage claims which have been submitted on behalf of the association, said there would be no justification at all for any of the members thinking "it is simply a window-dressing problem. We do," he added, "quite sincerely and conscientiously believe that the items which have been put forward ought to be rectified as soon as possible." The conference elected Mr. F. Watkins, M.P., for Central Hackney, as President of the association in succession to Mr. F. B. Simpson, M.P.

The London Bus Strike Ends

On Wednesday night it was announced from the Ministry of Labour that the London bus strike had been settled, and that the drivers and conductors would resume duty today (Friday). Towards the end of last week a further attempt was made to extend London's transport troubles by endeavouring to induce the board's tramwaymen and trolleybusmen to withdraw their labour. Such "sympathetic action" was, however, refused by the executive council of the Transport and General Workers' Union, and, after a meeting of the Central Bus Committee of the union on Saturday, May 22, Mr. Bevin made the following statement:—

"As a result of the discussion the General Secretary is summoning the executive council to consider the report which is the outcome of the discussions with the Central Bus Committee. The committee and the executive council have the matter actively in hand. We appreciate the way in which members have conducted themselves in this dispute, and we will report

to them, at the earliest opportunity, the result of the deliberations. Statements have been issued that I, as General Secretary, have ordered the members back to work. In the first place, I have no such authority, and certainly I have not done any such thing. The question of the settlement of this dispute is a matter for the responsible authorities of the union."

The executive council of the union met on Sunday, May 23, and a delegate conference assembled on Monday, May 24, and adjourned until Tuesday, when the executive council decided to take the control of the dispute from the hands of the Central Bus Committee. The following official statement was issued by Mr. Bevin:—

"There was a demand by the committee and that conference to extend the dispute to the tram and trolleybus services, in the firm belief that, by that extension, such pressure would be brought to bear that it would result in shortening the dispute. On the other hand, the executive council had before it the resolutions of the Tram Council and the Tram Delegate Conference and all the reports associated therewith. After consideration of the matter, with all its implications, the Executive came to the conclusion that an extension of the dispute in the manner indicated would not achieve the desired end. Having regard to all the facts and circumstances, the executive council decided that it must now assume responsibility for the further conduct of the dispute and negotiations in connection therewith, and the council has instructed that the necessary steps be taken to implement that decision forthwith. In a message to the members, the executive council expressed appreciation of the solidarity they have shown, and, having regard to the responsibility it has now undertaken in connection with the dispute, it requests members to remain steadfast until otherwise instructed by the executive council."

A statement of some significance appears in the current issue of the union's journal *The Record*. After reviewing the last offer of the board the article goes on to say:—

"Therefore, looking at the matter without any prejudice and without any undue desire to influence the members, the executive council suggests that this is a 75 to 80 per cent. victory, together with the possibility of obtaining better results from the investigation, having regard to the claims of the members, as to the effect of the industry on their health. The executive declared that it was reluctant to see this opportunity thrown away, and with its industrial experience, it seriously suggested that members of the bus section should reconsider the whole matter, and reflect whether it is not now wise to authorise the union to proceed to construct a new agreement and take advantage of all the recommendations and possibilities."

Court of Inquiry Final Report

On Tuesday night the final report of the Court of Inquiry was issued (Cmd. 5464). The interim report of the Court was summarised on page 952 of our issue of May 14. In the final report the Court says that "neither the statistics nor the oral evidence convinced us that the claim of injury of health was proved," but a *prima facie* case was made out for further and immediate

investigations by a properly qualified body specially constituted to deal with this important matter." The report, which is a lengthy document and is signed by Mr. John Forster (Chairman), Sir Arthur Pugh, and Mr. Basil Sanderson, concludes by expressing views upon the need for machinery of negotiation. It says:—

"There is an aspect of this dispute which, in the interests of the board and its staff, no less than in the public interest, we feel it necessary to raise. The conduct of an essential public service places upon those engaged in it a special responsibility. It is not possible in a country whose form of government is based upon free institutions to eliminate strikes or lockouts entirely; but this should not be because of inadequate means for final examination and judgment on matters of difference that may arise in the conduct of a public service, nor of unwillingness of the parties or persons involved to have recourse thereto.

"To adopt such a course as we have indicated above, when a stoppage has taken place is, in some degree, to nullify its value as a possible means of adjustment. Moreover, if the public has to suffer the social inconvenience and loss in its daily life it should, in advance, be well informed on the facts and merits of the case and be able to apportion the blame with correct judgment.

"Fortunately, the record of the relationship between those engaged on the London transport services has for many years been such as to make the methods of joint negotiation highly successful. This has produced material benefits to the staff, has given stability to the undertaking, and served the public interest. This, however, does but emphasise the significance of the present stoppage and the necessity for all reasonable means being taken to prevent its recurrence.

"We suggest, therefore, that there should be established by agreement as between the union and the board a final court of investigation and appeal on any matter where the ordinary methods of negotiation have failed to find a settlement. Such bodies exist in many important branches of industry. It is, in our judgment, imperative that it should find a recognised place in the London Passenger Transport Area."

The Settlement

Briefly the terms of settlement provide that all employees on strike who report for duty at scheduled time on Friday, May 28, shall be reinstated in their former employment, and the period of the strike shall not be deemed to be a break in service. Pending the conclusion of a new agreement, the men shall operate and be paid on the present basis. The board and the union accept the interim report of the Court of Inquiry, and the board re-affirms its statements issued in relation thereto.

Immediately work is resumed the parties shall meet and proceed to negotiate and settle the new agreement; set up the joint machinery required for the examination of the various questions arising out of scheduled duties, easements, etc.; and establish the joint machinery for the investigation of the conditions of employment in relation to the effect which such conditions have upon the health of the men.

Institute of Transport Luncheon to New South Wales Minister of Transport

Among the Coronation visitors to this country is Lt.-Col. the Hon. M. F. Bruxner, D.S.O., M.L.A., Minister of Transport and Deputy Premier of New South Wales. Col. Bruxner, who was the first Chairman of the New South Wales Centre of the Institute of Transport, was, on Tuesday last, entertained to lunch by past and present members of the Council of the Institute at the Trocadero Restaurant.

The chair was occupied by Sir Alfred Read, President of the Institute of Transport, who was supported by:—

Sir Alexander Gibb, G.B.E., C.B., F.R.S. (President-elect), Sir Sam Fay, Sir David J. Owen (Past Presidents), Messrs. E. C. Cox, C.V.O., C.B.E., D. Ross-Johnson, C.B.E., T. H. Watermeyer (Vice-Presidents), Sir Ralph L. Wedgwood, C.B., C.M.G., Messrs. A. W. Arthurton, C. Bostock, F. G. Bristow, C.B.E., A. R. Cooper, C. Cooper, W. H. Gaunt, O.B.E., A. Hacking, D.S.O., M.C., D. Halliwell, M.B.E., R. Kelso, D. R. Lamb, J. S. Nicholl, J. Pike, O.B.E., A. W. C. Richardson, D.S.O., C. E. R. Sherrington, M.C., C. J. Spencer, O.B.E., G. S. Szlumper, C.B.E., and Mr. A. Winter Gray, Secretary of the Institute.

The Chairman welcomed Col. Bruxner as one who ably represented the transport of a great Dominion and who had played a great part in the establishment of a centre of the institute in the Southern Continent.

Col. Bruxner, in his reply, briefly compared the transport problems of New South Wales with those of this country. As Minister controlling trans-

port he had to hold the balance between the railways and the roads. He was glad to say that the railways were recovering from the effects of the depression years, and had now reached a stage in which receipts balanced expenditure. The number of vehicles on the roads of New South Wales also had last year increased from 207,000 to 275,000. Although not comparable in size there were some points of similarity between London and Sydney in that both had developed without any definite plan or layout. The main streets of Sydney today corresponding roughly with the routes followed by the ox wagons which hauled merchandise from the ships at Sydney Cove to the town in the early days of the colony.

Australia was a country of vast distances and one of its transport problems had been to connect by railway important places many hundreds of miles apart, but which furnished no traffic in between. One of the main benefits of the Institute of Transport was that it offered a common meeting ground between opposing transport interests, and the New South Wales Centre, although small at present, was of great value in this respect.

A vote of thanks to the Chairman was proposed by Sir Cyril Hurcomb, Immediate Past-President of the Institute.

Road Accidents in Paris

Fatalities as a result of road accidents in Paris and suburbs amounted in 1936 to 435, compared with 463 in 1935. The 1936 figure was made up of 211 fatal accidents in Paris, and 224 in the suburbs. There was a reduction of 7 per cent. in the total number of fatalities. The following table compares the number of deaths caused by road accidents in Paris and suburbs from 1930 to 1936:—

FATAL ACCIDENTS IN PARIS AND SUBURBS							
	1936	1935	1934	1933	1932	1931	1930
Paris...	211	237	236	230	237	—	—
Suburbs	224	226	262	251	218	—	—
	435	463	498	481	455	499	603

Statistics have also been prepared showing the number of deaths in the various classes of road-users who suffered most in this respect during 1936, with the number and percentage of accidents in which the victim was himself to blame:—

Class of road-user	Deaths	Victim to blame	
		No.	Per cent.
Pedestrians ...	197	100	51
Cyclists ...	87	47	54
Motorcyclists ...	52	35	67
Passengers ...	40	29	72
Owner drivers ...	22	12	54
Taxis ...	2	1	50
Lorry drivers ...	6	1	16
Horse-drawn vehicles ...	1	1	100
	407	226	55

The following table shows the number of deaths caused by various classes of road-user, with the number and percentage of cases in which the driver was to blame:—

Class of road-user	Deaths caused	Cases in which driver was to blame	
		No.	Per cent.
Owner-drivers ...	188	111	59
Lorry drivers ...	126	62	49
Motorbuses ...	34	9	26
Taxis ...	31	24	77
Motorcyclists ...	24	19	79
Tramway vehicles ...	8	1	12
Horse-drawn vehicles ...	8	1	12
Cyclists ...	16	10	62
	435	237	64

The causes of accidents were very varied, but it has been established that 16 per cent. were due to drivers not having proper control over their vehicles at speed, or not slowing at dangerous crossings; 17 per cent. were due to drivers taking risks; and 11 per cent. to ignoring priority of other road users. The police statistics also show that the majority of fatal accidents occurred in the early evening. There were 138, or 1 in 3 of the total, between 5 p.m. and 8 p.m. The smallest number occurred during the night, there being only 33 fatal accidents between midnight and 6 a.m. in the course of the year.

MINISTRY OF TRANSPORT ACCIDENT REPORT

Road, L.M.S.R.: November 27, 1936

At about 4.5 a.m. the 12.5 a.m. sleeping car express, Manchester to Euston via Northampton, drawn by 4-6-0 engine No. 5541, collided, at about 20 m.p.h. when crossing from the up slow to the up fast, with engine No. 2821 attached in rear of some vehicles standing beyond the crossover on the former line. The vehicles formed the rear portion of the 8.35 p.m. up parcels train from Holyhead, propelled by the engine on the up fast line from Road Cutting signal box, where the train had been divided by a drawbar failure. The express engine and tender were completely derailed, the brake van next to them was telescoped for 8 ft., and the next vehicle damaged, as was the permanent

register at 3.50 a.m. and went to meet the rear portion, after being told of the movements proposed. Grimes lowered the starting signal, fast to slow, for the propelling movement to go towards the advanced starting signal, and waved a white light to hurry the driver on; he did not stop him for instructions. Later, seeing the tail lamp and side lamp, he was confident the engine was clear of the fouling point. He set the crossover, up slow to fast, and accepted the express. The accident occurred at 4.5 a.m., 4 minutes after the rear portion had stopped. He was sure the engine must have moved back after that; he would have expected the Stationmaster to have informed him if it was foul of the junction. It was very rare for such a movement to be made at Road Junction.

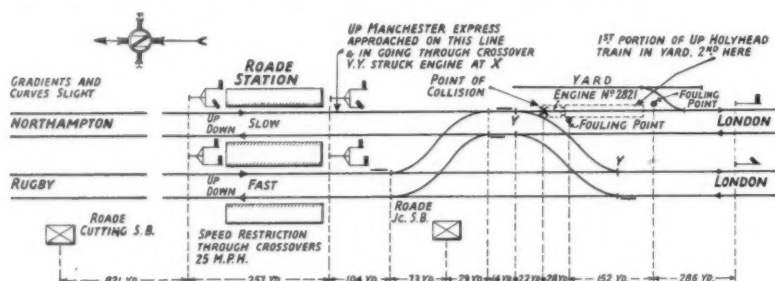


Diagram showing position of accident at Road

way. Nine of the standing vehicles suffered damage, and so did the engine tender. Seven passengers suffered minor injuries or shock. Driver Lawton, of the standing engine, was more seriously injured. The night was fine and clear but very dark. The accompanying diagram shows the lines and signals concerned. Major G. R. S. Wilson conducted the inquiry.

The parcels train, with engine No. 5690 and 37 vehicles and brake, vacuum fitted, found Road Junction distant signal "on," and the brake application brought about the drawbar failure at the front of the twenty-third vehicle. The vacuum connection separating, both portions stopped. Road Cutting box advised Blisworth, Road Junction, and the Bletchley District Controller; the latter arranged for the front portion to go forward to Road, and the rear portion to be propelled there by engine No. 2821, then at Blisworth; the defective wagon to be disposed of at Road and the train to proceed. The Road Junction signalman, J. W. Grimes, was told to cross the rear portion to the up slow line, and clear of the southernmost crossover to allow the express to cross from up slow to up fast. The rear portion of the parcels train arrived at Road at 4.1 a.m. with tail lamp on left of tender buffer beam, and a side light on the same side of the van.

Grimes said he called the Stationmaster, H. Lane, who signed the train

Stationmaster Lane confirmed what Grimes had agreed with him to do. He followed the propelling engine as it crossed to the up slow, and told the driver not to move until the express had passed, but did not mention which express. It did not occur to him to make sure the engine was clear; his mind was occupied with the disposal of the crippled wagon, but he did not instruct Driver Lawton about that, to avoid confusing him and possibly causing him to move prematurely and foul the path of the express. He told the guard also that no movement was to be made until the latter had passed. He was alongside the rear portion after it stopped and was certain it did not move again, which was confirmed by Driver Hands, of the Holyhead train, and his fireman.

Driver Lawton, engine No. 2821, found the signals set for him to cross to the up slow, and his fireman, Wilkinson, saw Grimes' white light. He was anxious to avoid blocking the trailing connection to the yard, but saw no particular reason to see he was clear of the up slow to up fast crossover. He was sure he was not instructed to stand clear for the express. Although all signals were track circuited he sent Wilkinson to the signal box, and shortly after saw headlights coming; he had only time to whistle. He was quite sure his engine had never moved after stopping, and did not hear points or signals being

operated, perhaps owing to the noise of the small ejector.

Wilkinson and Guard Williams gave similar evidence. The former was not asked by the signalman if the engine was clear of the points, and was himself not familiar with the connections at Road.

Driver Mullins, of the Manchester train, found the up slow to up fast signals clear and approached the junction at about 15 m.p.h. About a coach length from it he heard several sharp whistles and observed the tail lamp of the engine. He thought he had reduced speed slightly before the collision.

Major Wilson thinks it most unlikely, having regard to the evidence of independent witnesses, that the rear portion of the Holyhead train moved back after stopping, as Grimes suggested. Primary responsibility must rest on him; he failed to satisfy himself that the line was clear for the express. He relied on his sense of direction in the dark to determine that. This, without further confirmation, was inexcusable, particularly as the movement intended was unusual and he had therefore had little practice in judging the direction of the fouling point, in daylight or darkness. Means of confirmation were at his disposal; he could have obtained Lane's assurance that the junction was clear. He said he would have expected the latter to inform him if it was not, but this was, Major Wilson thinks, an afterthought. Like Lane, Grimes was probably pre-occupied with the disposal of the wagon and avoidance of delay. Considerable responsibility must rest with Lane, who failed to appreciate the position and act with initiative; he lost his head when confronted with an unusual situation. He frankly acknowledged his failure, but lack of outdoor operating experience may have proved a handicap to him. He had had little of it until quite recent years. It is to be regretted that Driver Lawton did not make certain he was clear of all junction connections, but his action cannot be seriously criticised; his anxiety to avoid blocking the connection to the yard would be uppermost with him and he was entitled to regard Lane as in charge of the situation. Driver Mullins had practically no opportunity to avoid or minimise the collision.

This accident was due to the failure of two men to act correctly. It could nevertheless have been prevented by a fouling bar (or track circuit) exercising the usual control on the junction signals. None of the fouling points is at a greater distance than 93 yd. from the centre of the box, and crossing movements behind standing or slowly moving trains were stated to be infrequent. Reliance is therefore placed on the signalman to satisfy himself by ordinary means that the fouling point is clear before he reverses the junction, and Major Wilson agrees with the company's officers that such protective equipment is not justified.

RAILWAY AND OTHER MEETINGS

Great Western of Brazil Railway Company Limited

The ordinary general meeting of the Great Western of Brazil Railway Co. Ltd. was held at River Plate House, Finsbury Circus, London, E.C.2, on May 26, Mr. G. H. Harrison, C.M.G., M.Inst.C.E., Chairman of the company, presiding.

The Chairman, in moving the adoption of the report and accounts, said it was regrettable that, coincident with the successful efforts of the company's General Manager and his staff to attract new traffic to the railway, there should have been an abnormal decrease in the sugar harvest, on which commercial prosperity largely depended, brought about by severe drought followed by extensive flooding. However, the total ton-kilometrage performed, including passenger traffic, represented a record in the history of the company. It must be admitted that, with their rolling stock and track in its present condition, they would have had difficulty in dealing efficiently with normal sugar production. He wished strongly to emphasise this point to the Brazilian authorities.

The effect of the increase in wages, granted at the end of 1935, was apparent for the complete year in 1936; but against that modifications were introduced into some of the tariffs, causing the average receipts per ton-kilometre to rise from 242 reis to 255 reis or 5.37 per cent. Other factors contributing to the higher expenses were increased fuel costs and heavier repairs to rolling stock.

As regards fuel, they had found it necessary to increase the proportion of coal to firewood. The former was more expensive in first cost, but the resultant improvement in engine performance to some extent offset this. It was largely a question of holding the balance between the advantage of the cheapness of wood fuel and economy in traffic movement. The fuel problem was likely to cause still greater anxiety, as they feared that the price of coal might rise to such an extent that the increased cost would become a serious burden.

The urgent need for new locomotives and rolling stock in order to maintain

an efficient transport service brought him to the question of financial aid from the Government. They had hoped to obtain small, but reasonable subsidies and a substantial loan to enable them to face the main cost of rehabilitation. They were advised that a sum of 12,000 contos (about £150,000) was being considered by the Brazilian Government as adequate to meet their needs; but he trusted that the authorities would give sympathetic attention to his definite statement that this sum was entirely inadequate, and that if it was not supplemented and the subsidies granted, efficient commercial movement in the railway zone would be in serious danger, and the interest on the company's 4 per cent. debentures, at the end of the current year, would be in very definite jeopardy. An efficient transport system was essential for the commercial progress of the zone.

In the current year there had been a drop in gross receipts to date of £19,000, and the sugar crop would again be sub-normal. On the other hand, exchange was improving, and should be maintained by the country's increasingly favourable balance of trade.

The report and accounts were unanimously adopted.

RAILWAY AND OTHER REPORTS

Buenos Ayres & Pacific Railway.

—The directors have decided to pay one half-year's arrears of interest to July 1, 1933, on the 4½ per cent. consolidated debenture stock, and to hand the Argentine Great Western Railway Company a sum sufficient to enable it to distribute one half-year's arrears of interest to October 1, 1933, on its 5 per cent. debenture stock. Six months' interest to June 30, 1937, will also be paid on Buenos Ayres & Pacific 4½ per cent. second debenture stock and on Argentine Great Western 4 per cent. second debenture stock. Similar distributions were made in March last on B.A.P. 4½ per cent. consolidated and on A.G.W. 5 per cent. debenture stocks.

Antofagasta (Chili) & Bolivia Railway.

—The preliminary statement shows that the net revenue for 1936 was approximately £138,391. This figure is arrived at after including a dividend from the Andes Trust and income arising from other investments and after providing for the full year's interest on the debenture stocks and reserving an unstated amount for exchange depreciation. After deducting £49,816 payable under the lease of the Aguas Blancas Railway, and £50,000 for the dividend of 2½ per cent. paid on December 15 last on account of arrears of dividend on the 5 per cent. cumulative preference stock, there is a balance of £38,575, to which is added £147,607 brought forward, making £186,182. It is proposed to pay on June 16 a dividend of 2½ per cent. on the 5 per cent. cumulative preference stock, being the balance payable in respect of

1933, leaving approximately £136,000 to be carried forward.

British Oxygen Co. Ltd.—The consolidated profits of the organisation, including the company's share of the profits of the various subsidiary companies, amounted in 1936 to £995,781. After deduction of depreciation and of the contribution to the staff and works pension funds, they were £665,045. From this there falls to be deducted a preference dividend distribution for the year amounting to £32,500, the ordinary interim dividend paid of £173,997, and the provision for the final ordinary dividend, amounting to £227,300, giving a total of £433,797, and leaving a balance of £231,248. This represents the balance of the profits of the company and of its

subsidiaries retained for special appropriations and allocation to reserves and undistributed profit balances.

Babcock & Wilcox Limited.

—The accounts for 1936 show an increase in net profits from £480,412 for 1935 to £545,678. This is arrived at after contributing £23,662 to pension funds (against £21,083 for 1935) and placing £18,357 to reserve for income tax. The directors propose to increase the final dividend on the ordinary shares from 4 per cent. to 6 per cent., making the total for the year 10 per cent., against 8 per cent. They are again placing £100,000 to dividend equalisation fund (increasing that fund to £400,000), leaving £66,652 to be carried forward. The volume of the company's trade has improved in both the home and export markets.

Exports of Railway Material from the United Kingdom in April

	Apl., 1937	Apl., 1936	Four Months Ending	
	£	£	Apl., 1937	Apl., 1936
Locomotives, rail	76,656	26,908	438,496	469,197
Carriages and wagons	301,481	136,352	868,149	562,693
Rails, steel	63,925	81,384	313,581	274,110
Wheels, sleepers, fishplates and miscellaneous materials	137,653	97,285	416,992	234,087

Locomotive and rail exports included the following:—

	Locomotives		Rails	
	Apl., 1937	Apl., 1936	Apl., 1937	Apl., 1936
Argentina	20,437	4,757	2,343	1,456
Union of South Africa	—*	—*	27,751	17,817
British India	32,464	15,113	6,599	10,705

* Figures not available

NOTES AND NEWS

Progress of Railway Bills.—The Lords' amendments to the Great Western and the Southern Railway Bills were considered and agreed to by the House of Commons on May 24. The measures now await the Royal Assent. The L.M.S.R. Order Confirmation Bill was to be considered on report in the House of Lords yesterday.

Motorbus Causes Canopy Collapse at Manchester (Victoria).—A skidding motorbus struck one of the supports of the glass and iron canopy over the roadway at Manchester (Victoria) station, L.M.S.R., on May 21, causing the first bay of the canopy to collapse. Two women passengers in the bus were slightly injured.

Swiss Whitsuntide Traffic.—Favourable weather at Whitsuntide produced a considerable amount of additional traffic, receipts on the Federal Railways from Saturday to Monday being 8 per cent. higher than during the same weekend last year. In all, 611 special trains were run, as against 455 in 1936; 202 of these were from Zurich, 129 from Basle, 100 from Berne, 94 from Lausanne, 62 from Lucerne, and 24 from Geneva.

International Container Conference.—The Bureau International des Containers is holding a conference in Paris from June 16 to June 19, in connection with its annual general meeting. In addition to meetings for discussion, visits will be paid to the container exhibition organised by the French railways at the International Exhibition, and to a demonstration of recent types of containers and handling equipment at Paris-Batignolles station.

Fire at L.M.S.R. Birmingham Goods Station.—One of the most disastrous fires in the history of Birmingham occurred on Wednesday morning last, at Lawley Street goods station, L.M.S.R. A three-storey warehouse, containing large stocks of soap, grain, cocoa and paper was gutted. The fire lasted for nearly three hours. It is believed that the warehouse was the largest and most heavily stocked on the L.M.S.R. with the exception of that at St. Pancras. The goods were valued at £1,000,000 and the damage has caused a loss of many thousands of pounds. So far the cause of the fire is unknown.

Institution of Railway Signal Engineers.—At a meeting in London on May 26, Mr. E. A. Bayles, A.M.Inst.E.E., gave an informal address on "Rubber Insulated Cables and the Effect of Outside Conditions and Agencies on the Dielectric." In the discussion the following spoke: Messrs. T. Austin, H. H. Dyer, W. E. Tremain, E. E. Pierce, M. G. Tweedie, A. Moss, G. H. Crook, W. Lang, and the President, Mr. H. M. Proud. Mr. T. Austin was elected Honorary Auditor in place of Mr. J. C. Brunjes. Members will assemble at 2.0 p.m. on Saturday, May 29, at No. 21

Platform, Waterloo station, Southern Railway to inspect the power signalling installation.

Transport Tour in U.S.S.R.—Under the auspices of the Society for Cultural Relations with the U.S.S.R., a three-weeks tour of the U.S.S.R. is being undertaken to study rail, road, air and water transport. Particulars will be found in our Official Notices column on page 1043.

Entre Rios Railways' Moratorium.—A scheme of arrangement between the Entre Rios Railways Company and the holders of its 4 per cent. debenture stock, 5 per cent. debentures, and 5 per cent. consolidated debenture stock has been proposed and will be submitted for approval at separate meetings of those holders convened for June 18 at River Plate House, E.C. The existing debenture interest moratorium expires on July 1.

"Southern Rhodesia" Locomotive Naming Ceremony.—Dr. Huggins, the Prime Minister of Southern Rhodesia, named the L.M.S.R. locomotive No. 5595, *Southern Rhodesia*, at a ceremony which took place at Euston station yesterday, May 27. The L.M.S.R. was represented by Mr. E. B. Fielden, Deputy Chairman of the company, and Southern Rhodesia's Coronation contingent of troops supported Dr. Huggins.

Channel Tunnel Company.—Baron Emile d'Erlanger, presiding on May 26 at the ordinary general meeting of the Channel Tunnel Co. Ltd., said it was recognised the future of England depended not only upon the supremacy of the sea, but also upon the adequacy of the air force to defend our frontiers, which were, in military parlance, somewhere upon the Continent of Europe. In time it would be recognised that the Channel Tunnel was one of the first and one of the best conditions for the transport of troops to the Continent.

American Railway Joint Advertising.—The joint advertising campaign on behalf of all U.S.A. railways which has been conducted for the past year by the Association of American Railroads, will be continued for another year at a cost of some £244,000. This advertising consists of one-page or double-page advertisements monthly, and is restricted to magazines of national circulation, the opinion being that the advertisements of the individual railways in the daily newspapers adequately represent the railway industry in that (localised) sector of the press. The publicity activities of the association are far more widespread than this series of advertisements, and include an extensive machinery for: (1) providing speakers on railway subjects for meetings of all kinds; (2) the distribution of millions of pieces of direct-mail publicity literature; (3) the production and distribution of educa-

tional films for display among railway employees, in order to inculcate courtesy and improve efficiency; (4) facilitating the work of writers who may prepare articles on railway working, by supplying information, photographs, &c.; (5) arranging for exhibitions of modern railway rolling stock at various places for public inspection; and a host of similar projects for popularising the railways in public appreciation.

International Congress on Chronometry and Metric Measurement.—An international congress on the above subjects will be held in Paris from July 6 to 11. All questions concerning the measurement of time, length and weight will be discussed, particularly with reference to such measurements in the engineering industries. Further particulars may be had from the General Secretary's office, 29 Rue de Berri, Paris, 8e.

New Steel Furnace at Appleby.—We are informed by the United Steel Companies Limited that its associated company, the Appleby-Frodingham Steel Co. Ltd., has recently installed a new 300-ton tilting steel furnace at the Appleby works. This furnace, which was erected at remarkable speed, will have an output of 2,000 tons a week. In addition, blast furnaces at the Frodingham works have been relined and will shortly be capable of a weekly output of approximately 1,400 tons.

L.N.E.R. Rolling Stock Exhibitions.—In aid of the Victoria Cottage Hospital (Barnet) Extension, the East Barnet Nursing Association and Railway Staff Charities, a railway exhibition of engines and rolling stock will be held at New Barnet, L.N.E.R., goods station on June 5 and 6. The Chairman of the L.N.E.R., Mr. William Whitelaw, will preside at the opening ceremony, which will be performed by the Rt. Hon. Sir Philip Sassoon, M.P. The exhibition will comprise specimens of the company's latest locomotives, and passenger, freight and road vehicles. At a similar exhibition to be held at Walthamstow on Saturday and Sunday a new "Sandringham" class engine will be officially named *Tottenham Hotspur*.

Reorganisation of French Railways.—Plans for reorganisation of the railways have not yet taken definite shape, although it was originally declared that they would be laid before Parliament by March 31. Some indications of the form they may assume were recently given in the press. It was stated that M. Bedouce, Minister of Public Works, was preparing a project, which would involve State control of the existing companies; under this system the State railway debt of fr. 25,000 million would be converted into ordinary shares of the railway companies. As the total capital of the railway systems is about fr. 7,000 million, the State would immediately become the holder of about 80 per cent. of the shares in the new organisation, which might be considered

as a consolidation of the present systems under the control of a single company. According to the press, M. Auriol, Minister of Finance, had outlined this plan in a statement before the Finance Committee of the Chamber. M. Auriol, though he denied the report, and said he had cited no figures and suggested no plan, added that it seemed to him absolutely necessary to absorb the railway deficit as soon as possible. Details of the proposed reform of the railways, concluded M. Auriol, would be submitted to a Cabinet Council by the Minister of Public Works at an early date.

The West Riding Limited.—In response to a request by the L.N.E.R. for names for the new streamlined express train between the West Riding and the Metropolis, no fewer than 675 suggestions were made. The directors of the L.N.E.R. have now made their choice, and the train, which will come into service in September next, is to be known as the West Riding Limited. The up train will leave Bradford at 11.10 a.m., and Leeds at 11.31 a.m. It

will then perform the 186 miles to King's Cross at an average speed of 68 m.p.h., arriving at 2.15 p.m. The return train will be even faster; leaving King's Cross at 7.10 p.m., it will travel to Leeds at 68.5 m.p.h., arrive 9.53 p.m., and terminate at Bradford at 10.15 p.m. This will be the fastest service ever instituted by any company's route between the West Riding and London.

International Tourism.—The official travel organisations of the principal European countries will meet in conference in Berlin next Tuesday (June 1) for a friendly interchange of points of view and the discussion of common problems. It is the 11th Congress of the Union Internationale des Organes Officiels de Propagande Touristique. One of the subjects on the agenda is the establishment of an international system for the comparison of tourist figures and expenditure. Great Britain will be represented by Mr. H. B. Brennan, Assistant Manager of the Travel and Industrial Development Association of Great Britain and Ireland.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 20th Week			Totals to Date		
	1937	1936	Inc. or Dec.	1937	1936	Inc. or Dec.
L.M.S.R. (6,877 mls.)						
Passenger-train traffic...	575,000	447,000	+ 128,000	8,771,000	8,201,000	+ 570,000
Merchandise, &c. ...	440,000	494,000	- 54,000	9,684,000	9,534,000	+ 150,000
Coal and coke ...	211,000	206,000	+ 5,000	5,474,000	5,169,000	+ 305,000
Goods-train traffic ...	651,000	700,000	- 49,000	15,158,000	14,703,000	+ 455,000
Total receipts ...	1,226,000	1,147,000	+ 79,000	23,929,000	22,904,000	+ 1,025,000
L.N.E.R. (6,330 mls.)						
Passenger-train traffic...	367,000	287,000	+ 80,000	5,739,000	5,392,000	+ 347,000
Merchandise, &c. ...	312,000	336,000	- 24,000	6,706,000	6,521,000	+ 185,000
Coal and coke ...	215,000	218,000	- 3,000	5,104,000	4,895,000	+ 209,000
Goods-train traffic ...	527,000	554,000	- 27,000	11,810,000	11,416,000	+ 394,000
Total receipts ...	894,000	841,000	+ 53,000	17,549,000	16,808,000	+ 741,000
G.W.R. (3,738 mls.)						
Passenger-train traffic...	230,000	188,000	+ 42,000	3,651,000	3,453,000	+ 198,000
Merchandise, &c. ...	164,000	194,000	- 30,000	3,885,000	3,780,000	+ 105,000
Coal and coke ...	70,000	97,000	- 27,000	2,252,000	2,103,000	+ 149,000
Goods-train traffic ...	234,000	291,000	- 57,000	6,137,000	5,883,000	+ 254,000
Total receipts ...	464,000	479,000	- 15,000	9,788,000	9,336,000	+ 452,000
S.R. (2,153 mls.)						
Passenger-train traffic...	381,000	287,000	+ 94,000	5,640,000	5,219,000	+ 421,000
Merchandise, &c. ...	56,000	68,500	- 12,500	1,176,000	1,240,500	- 64,500
Coal and coke ...	23,000	24,500	- 1,500	640,000	666,500	- 26,500
Goods-train traffic ...	79,000	93,000	- 14,000	1,816,000	1,907,000	- 91,000
Total receipts ...	460,000	380,000	+ 80,000	7,456,000	7,126,000	+ 330,000
Liverpool Overhead ...	1,390	1,115	+ 275	23,942	22,231	+ 1,711
Mersey (4½ mls.) ...	4,276	3,771	+ 505	84,776	81,318	+ 3,458
*London Passenger Transport Board ...	453,500	570,100	- 116,600	25,967,400	25,613,800	+ 353,600
IRELAND						
†Belfast & C.D. (80 mls.) pass.	2,702	2,092	+ 610	38,480	38,765	- 285
" " goods	507	538	- 31	10,136	11,510	- 1,374
" " total	3,209	2,630	+ 579	48,616	50,275	- 1,659
Great Northern (543 mls.) pass.	10,800	9,250	+ 1,550	171,900	170,100	+ 1,800
" " goods	9,500	9,850	- 350	188,900	206,950	- 18,050
" " total	20,300	19,100	+ 1,200	360,800	377,050	- 16,250
Great Southern (2,075 mls.) pass.	37,365	32,111	+ 5,254	583,915	587,371	- 3,456
" " goods	32,779	41,374	- 8,595	831,469	853,356	- 21,887
" " total	70,144	73,485	- 3,341	1,415,384	1,440,727	- 25,343

Whitsun Monday, 1937

* 47th week (before pooling)

Central Bus Strike

† 21st week

British and Irish Railway Stocks and Shares

Stocks	Highest 1936	Lowest 1936	Prices	
			May 28, 1937	Rise/Fall
G.W.R.				
Cons. Ord. ...	64½	45½	63½	+3¼
5% Cons. Prefce. ...	126½	116½	120½	+2
5% Red. Pref. (1950) ...	113	108½	111½	—
4% Deb. ...	119½	110½	110½	+½
4½% Deb. ...	121	114	112	+1
4½% Deb. ...	129	121	119½	+1
5% Deb. ...	141	134	130½	+2
2½% Deb. ...	79½	74	70½	+1
5% Rt. Charge ...	136½	130	128½	—
5% Cons. Guar. ...	135½	127½	127½	+½
L.M.S.R.				
Ord. ...	35½	17	34	+3½
4% Prefce. (1923) ...	83	52½	77½	+3½
4% Prefce. ...	92½	81	87	+3½
5% Red. Pref. (1955) ...	109½	103½	105½	+1
4% Deb. ...	111½	105½	106½	+1½
5% Red. Deb. (1952) ...	119½	115½	115½	+1
4% Guar. ...	106½	101½	101½	—
L.N.E.R.				
5% Pref. Ord. ...	14	9	10½	+1
Def. Ord. ...	7½	4½	5½	+1½
4% First Prefce. ...	79½	55½	71	+3½
4% Second Prefce. ...	31½	18½	26	+2½
5% Red. Pref. (1955) ...	100½	77½	95	+2
4% First Guar. ...	104½	98½	100	+2
4% Second Guar. ...	99	90	92	+1
3% Deb. ...	85½	79	81	+1
4% Deb. ...	109½	104½	105½	+1
5% Red. Deb. (1947) ...	116½	110½	109½	—
4½% Sinking Fund Red. Deb.	111½	107½	108½	—
SOUTHERN				
Pref. Ord. ...	98½	82½	92	+1½
Def. Ord. ...	27½	20½	24	+1½
5% Pref. ...	120½	118½	119½	+2
5% Red. Pref. (1964) ...	119½	115½	115½	—
5% Guar. Prefce. ...	136	129½	127½	+1
5% Red. Guar. Pref. (1957) ...	120	115½	115½	+1
4% Deb. ...	117½	109½	109½	+½
5% Deb. ...	140	134	128½	+½
4% Red. Deb. 1962-67	116½	110	110½	+½
BELFAST & C.D.				
Ord. ...	9	4½	4	—
FORTH BRIDGE				
4% Deb. ...	107	105	102½	—
4% Guar. ...	107½	104	102½	—
G. NORTHERN (IRELAND)				
Ord. ...	19½	9½	8½	—
G. SOUTHERN (IRELAND)				
Ord. ...	63	41	42	—
Prefce. ...	65	46	52	—
Guar. ...	97½	81	77	-1½
Deb. ...	99½	83½	93	—
L.P.T.B.				
4½% "A" ...	127½	121	115½*	-2
5% "A" ...	138½	133½	124½*	-2
4½% "T.F.A." ...	111½	108½	108	—
5% "B" ...	131½	123½	115½*	—
"C" ...	112½	93	87	+3
MERSEY				
Ord. ...	40½	23	31½	—
4% Perp. Deb. ...	103	98	99	—
3% Perp. Deb. ...	78	74½	75½	—
3% Perp. Prefce. ...	68½	63½	63½	+1

* ex dividend

CONTRACTS AND TENDERS

Hudswell, Clarke & Co. Ltd. has received an order from the Anglo-Iranian Oil Co. Ltd. for a 150-b.h.p. diesel-mechanical locomotive which is to be fitted with a Vulcan-Sinclair fluid coupling.

In connection with the rebuilding and extension of York station, the L.N.E.R. has placed a contract with Dorman Long & Co. Ltd., of Middlesbrough, for the steelwork required for the new foot-bridge, lift framing, and the platform roofs for the new portion of the station, which is to be built to the west of the existing station building. The re-modelling of the station is one of the works undertaken by the L.N.E.R. under the Government Assistance Scheme. The number of platforms will be increased from 14 to 16, and the new platforms will be notable for their length, as each will be 1,180 ft. long. New waiting and refreshment rooms of modern design are to be provided and for dealing with luggage and parcels traffic six new electric lifts are to be installed.

D. Wickham & Co. Ltd. has received orders from the Buenos Ayres Great Southern Railway for six 40-seater four-wheeled railcars and 17 No. 17 permanent-way gang trolleys.

D. Wickham & Co. Ltd. has also received an order from the Buenos Ayres Western Railway for seven No. 17 permanent-way gang trolleys.

The South Indian Railway Administration has placed the following orders, to the inspection of Messrs. Robert White & Partners :—

Alex. Findlay & Co. Ltd., Six 150-ft. through-spans steelwork, approximately 610 tons in weight.

Fried. Krupp A.-G., Seven 150-ft. through-spans steelwork, approximately 712 tons in weight.

Mather & Platt Limited, 11 train-lighting dynamos and accessories.

The Antofagasta (Chili) & Bolivia Railway is inquiring for diesel railcars of approximately 140-b.h.p.

The Hydraulic Coupling & Engineering Co. Ltd. has received an order for 11 traction-type fluid couplings for installation in railcars being converted from petrol to diesel engines by the Netherlands Railways.

The American Car & Foundry Company has received an order for 200 chilled cast iron wheels for 30-ton wagons from the Entre Rios Railways.

The Roumanian State Railways Administration has ordered 21 steam locomotives of the 2-8-4 type from the Malaxa company and 21 from the Reschitza company. The design of these engines is based on that of the Austrian two-cylinder 2-8-4 engines.

George Richards & Co. Ltd. has received an order for one electrically-driven vertical boring and turning mill from the Buenos Ayres Western Railway.

Beyer, Peacock & Co. Ltd. has received an order from the Crown Agents for the Colonies for two Beyer-Garratt 4-6-2 + 2-6-4 articulated locomotives for the Nigerian Government Railway additional to the four recently ordered from this firm for the same administration, as recorded on this page in our issue of May 7.

Beyer, Peacock & Co. Ltd. has also received an order for one 4 ft. 8½ in.-gauge 2-8-0 Consolidation type locomotive for the Southern Railway of Peru.

The North British Locomotive Co. Ltd. has received an order from the Crown Agents for the Colonies for 11 metre-gauge three-cylinder 4-6-2 type locomotives and tenders.

The Bombay, Baroda & Central India Railway has placed orders to the inspection of Messrs. Rendel, Palmer & Tritton with Fried. Krupp A.-G. for 600 volute springs and with Smith & Maclean Limited for 853 panel plates.

The Birmingham Railway Carriage & Wagon Co. Ltd. has received a further order from the Crown Agents for the Colonies for 11 four-wheeled brake vans, required for the Kenya & Uganda Railways.

Taylor Bros. & Co. Ltd. has received an order for 984 pairs of wheels and axles for carriages and wagons and 200 pairs of wheels and axles for bogie tank wagons, from the Buenos Ayres Great Southern and Buenos Ayres Western Railways.

The Associated Equipment Co. Ltd. has recently received the following orders from railway associated road transport operators :—

United Automobile Services Limited, five oil-engined passenger vehicles.

City of Oxford Motor Services Limited, three oil-engined Regent passenger vehicles.

London Passenger Transport Board, 24 Renown oil-engined passenger vehicles.

Pickfords Limited, One oil-engined Mator goods vehicle.

Ransomes & Rapier Limited has received an order for one half-cubic yard capacity mechanical excavator from the Buenos Ayres Great Southern Railway.

Fried. Krupp A.-G. has received an order from the Morvi Railway Administration, to the inspection of Messrs. Robert White & Partners, for two metre-gauge 4-6-0 locomotives and six-wheeled tenders.

The Bengal-Nagpur Railway Administration has recently placed the following orders :—

Tees Side Bridge & Engineering Co. Ltd., 300 drawbars.

Superheater Co. Ltd., Quantity of superheater elements.

Brown Bayley's Steel Works Limited, 500 tyres.

Steel Company of Scotland Limited, 500 tyres.

Rheinisches Klein Eisenwerk, 500 laminated springs.

Fried. Krupp A.-G., 500 laminated springs.

The Madras & Southern Mahratta Railway has placed the following orders to the inspection of Messrs. Rendel, Palmer & Tritton :—

J. Baker & Bessemer Limited, 86 carriage and wagon tyres.

English Steel Corporation, 240 locomotive tyres.

George Turton Platts & Co. Ltd., 36 buffers, 200 casings and 60 plungers and floating spindles.

Balmer, Lawrie & Co. Ltd. has received orders from the North Western Railway of India for the supply of combination fishplates, of British manufacture, required under Enquiry No. 211 S/203 at Rs. 3-11-6. Total price Rs. 66,190, f.o.r. Karachi.

Alfred Herbert Limited has received an order from the Chinese Government Purchasing Commission for one hexagon turret lathe and one capstan lathe, required for the Canton-Hankow Railway.

The Union Pacific Railroad is to acquire 4,088 freight cars at a cost of approximately \$14,000,000. The American Car & Foundry Company is to supply 1,000 ballast and coal cars, and 200 tank cars are to be built by the General American Transportation Corporation. The remaining vehicles are to be built at the Omaha and Portland shops of the Union Pacific.

The Egyptian State Railways Administration invites tenders, closing on July 10, for two diesel-electric shunting locomotives of the 0-6-0 type. Specifications and form of tender may be obtained from the Chief Inspecting Engineer's Office, 41, Tothill Street, S.W.1.

Tenders are invited by the Bombay, Baroda & Central India Railway, receivable at the White Mansion, 91, Petty France, Westminster, S.W.1, by June 2, for the supply of copper firebox plates, and receivable by June 4 for the supply of locomotive, carriage and wagon axles, carriage and wagon buffers, laminated springs, steel boiler flue and arch tubes, locomotive, carriage and wagon tyres and helical and volute springs.

The South African Railways & Harbours Administration invites tenders receivable by July 19 in Johannesburg for the supply of 12 3-ft. 6-in. gauge electric locomotives with roller bearing axleboxes of specified types. Alternative quotations are invited for 22 electric locomotives.

The South African Railways & Harbours Administration is calling for tenders, to be presented in Johannesburg by July 5, for the supply of quantities of genuine raw and boiled linseed oil. Firms desirous of offering oil of United Kingdom manufacture can obtain further details from the Department of Overseas Trade.

The South African Railways and Harbours Administration is calling for tenders, to be presented in South Africa by July 26, for the construction, supply, and delivery of one self-propelling steam breakdown crane of 36 tons capacity. Firms desirous of offering a crane of

(continued at foot of next page)

Transport Tour of the U.S.S.R.

UNDER the leadership of Mr. Brian Reed, of THE RAILWAY GAZETTE, a tour for the study of all forms of transport in the U.S.S.R. will be undertaken from July 17 to August 8. Visits to Leningrad, Moscow, and Kharkov (the Russian "Crews"). Price £26 10s. to £37 10s. according to class. Particulars from Society for Cultural Relations with the U.S.S.R., 98, Gower Street, London, W.C.1.

REQUIRED for a large Wagon Works in India, a Works Inspector to take charge of Inspection Dept. Should have had similar experience in large modern works and be competent to undertake the inspection and testing of all material, component parts and completed steel carriage frames and wagons. Single man preferred, between 25 and 35 years of age, with good technical education. Five year agreement, free passages, provident fund, free unfurnished quarters, and salary according to qualifications. Apply by letter, with copies of testimonials, stating age and whether married or single, to SOLEBAR, c/o W. ABBOTT, LTD., 32, Eastcheap, London, E.C.3.

Canadian National Railway Company

WELLINGTON GREY & BRUCE RAILWAY COMPANY, 7 PER CENT. BONDS.

AT the semi-annual ballot for May, 1937, the following Wellington Grey & Bruce Railway Company 7 per cent. Bonds were drawn and will be paid at par at the offices of the Canadian National Railway Company in Montreal, Canada, or at Orient House, 42/5, New Broad Street, London, E.C.2, England, on the 1st July next, that is to say, Bonds numbered: 104, 269, 299, 455, 599, 660, 680, 797, 837, 880, 1019, 1183, 1343, 1361, 1489, 2264, 2271, 2418, 2422, 2435, 2455, 2549, 2576, 2637, 2678, 2746, 2930, 2953, 2954, 3084, 3184, 3246, 3267, 3320, 3371, 3577, 3651, 3837, 3946, 3993, 4050, 4079, 4145, 4154, 4244, 4274, 4289, 4393, 4439, 4501, 4522, 4643, 5044.

In all £5,300 sterling.

Holders of these Bonds will take notice that the interest will cease after 1st July next.

A. H. CONEYBEARE,

European Secretary and

Treasurer.

London.

27th May, 1937.

REQUIRED.—One permanent and one temporary Draughtsman in Railway Signal and Telegraph Engineer's Office in London.

Applicants to be capable of preparing in all stages, including layouts and circuit plans, schemes for colour light and power signalling installations.

Salary offered up to £7 7s. per week, according to qualifications.

Applicants to give details of experience, qualifications, &c., to Box 22, c/o THE RAILWAY GAZETTE, 35, Tothill Street, London, S.W.1.

Buenos Ayres Great Southern Railway Company Limited

THE Directors of the Buenos Ayres Great Southern Railway Limited hereby give notice that the Register of Debenture Stockholders of the Company will be closed from Thursday, the 3rd June, to Wednesday, the 16th June, 1937, both days inclusive.

By Order of the Board,

N. F. E. GREY,

Secretary.

River Plate House,
Finsbury Circus,
London, E.C.2.

27th May, 1937.

(Continued from page 1042)

United Kingdom manufacture can obtain further details from the Department of Overseas Trade.

The South African Railways & Harbours Administration is calling for tenders (Tender No. 1313) for the supply and delivery of quantities of steel tyres and axles for various types of rolling stock. Tenders endorsed "Tender No. 1313, Steel Tyres and Axles," should reach the Secretary, South African Railways Headquarters Offices, Johannesburg, by July 6.

The South African Railways & Har-

Travancore State, Southern India

SUPERINTENDENT OF ROAD TRANSPORT.

APPPLICATIONS are invited for the above post in the State of Travancore.

Duties. The duties of the appointment comprise the control and management under the Government of road passenger services (commencing with about 60 units), which will be extended if successful.

Qualifications.

- (1) Age not less than 30 years.
- (2) Experience in a responsible position in the transport industry, including preferably an engagement as—
Assistant Transport Superintendent to large commercial undertaking, or with a Railway Company in the Road Transport Department.
- (3) Experience of operating passenger services.
- (4) Sufficient mechanical knowledge to control and organise a new road service undertaking.

Salary. According to qualifications and experience from British Rupees 1,000 to 1,200 per month. Consideration will be given to an interest in the successful operation of the scheme approaching 5 per cent. on the net profits.

Applications are to be by letter only and will be treated as confidential. They are to give full particulars of age, education, whether married or single, professional qualifications, experience at home and overseas, positions held in the past and present position, and are to be addressed to E. W. SLAUGHTER, c/o H.E.H. the Nizam's State Railway Board, 274, Gresham House, Old Broad Street, London, E.C.2.

27th May, 1937.

THE Proprietor of Patent No. 390,953 for "Improvements in or relating to Wheels, especially for Railway and other Similar Vehicles," is desirous of entering into arrangements by way of license and otherwise on reasonable terms for purpose of exploiting same and ensuring its full development and practical working in this country. All communications should be addressed in the first instance to HASELTINE LAKE & CO., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

Canadian National Railway Company

WELLINGTON GREY & BRUCE RAILWAY COMPANY, 7 PER CENT. BONDS.

NOTICE IS HEREBY GIVEN that the estimated earnings of the Wellington Grey & Bruce Railway Company for the half-year ending 30th June, 1937, applicable to meet interest on the above Bonds, will admit of the payment of £4 0s. 3d. per £100 Bond, and that this payment will be applied as follows, viz.:—
£3 7s. 9d. in final discharge of Coupon No. 110 due 1st July, 1925; and 12s. 11d. on account of Coupon No. 111 due 1st January, 1926, and will be made on and after 1st July next at the offices of the Canadian National Railway Company, Orient House, 42/5, New Broad Street, London, E.C.2, England.

The coupons must be left three clear days for examination.

A. H. CONEYBEARE,

European Secretary and

Treasurer.

London.

27th May, 1937.

bours Administration is calling for tenders (Tender No. 1288) for the supply and delivery of 100 bogie goods guards' vans, "V. 29" type, 3-ft. 6-in. gauge; 200 spare top bogie centres; and 200 spare bottom bogie centres. Tenders endorsed "Tender No. 1288, 100 Type 'V. 29' Vans" should reach the Secretary to the Tender Board, South African Railways Headquarters Offices, Johannesburg, by July 19.

The Crown Agents for the Colonies have recently placed orders for material and equipment as follows:—

C. Richards & Sons Limited, Bolts and nuts.

London and North Eastern Railway

NOTICE IS HEREBY GIVEN that, for the purpose of preparing the warrants for interest on the Company's 3 per cent. and 4 per cent. Debenture Stocks and 4 per cent. Sinking Fund Debenture Stock for the half-year ending 30th June, 1937, the balances will be struck as at the close of business on 11th June, and interest will be payable only to those Stockholders whose names are registered on that date.

Transfers of the above mentioned Stocks should, therefore, be lodged with the Registrar of the Company at Hamilton Buildings, Liverpool Street Station, London, E.C.2, before 5.0 p.m. on 11th June.

By Order,

JAMES McLAREN,

Secretary.

Marylebone Station,
London, N.W.1.

28th May, 1937.

South Indian Railway Company, Limited

THE Directors are prepared to receive Tenders for the supply of:—
FIVE LOCOMOTIVE BOILERS FOR "K" CLASS SATURATED ENGINES (B.G.).
Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders addressed to the Chairman and Directors of the South Indian Railway Limited, marked "Tender for Boilers," with the name of the firm tendering, must be left with the undersigned not later than 12 Noon, Friday, the 18th June, 1937.

The Directors do not bind themselves to accept the lowest or any Tender.

A charge, which will not be returned, will be made of 10s. for each copy of the Specification. Copies of the drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, London, S.W.1.

E. A. S. BELL,

Managing Director.

91, Petty France,

Westminster, S.W.1.

26th May, 1937.

AN AUDITOR will shortly be required by the Bengal Doonars Railway on salary Rs. 1,250 p.m., rising by Rs. 50 p.m. annual increments to Rs. 1,500 p.m. Service conditions in accordance with Indian Railways' usual practice. Applicants should be under 45 years of age and of non-Asiatic domicile. Indian Railway experience is essential. Applications in the first instance must be made by letter addressed to "F.R." c/o STREETS, 6, Gracechurch Street, London, E.C.3.

THE MADRAS & SOUTHERN MAHARATTA RAILWAY COMPANY LIMITED invite Tenders for:—

55 STEEL STRAIGHT AXLES FOR LOCOMOTIVES (54 Broad Gauge and 1 Metre Gauge).

Specification and Form of Tender can be obtained at the Company's Offices, 25, Buckingham Palace Road, Westminster, S.W.1.

Fee ONE GUINEA each which will not be returned.

Tenders must be submitted not later than 2 o'clock p.m. on Tuesday, 16th June, 1937.

The Directors do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right of reducing or dividing the order.

By Order of the Board,

G. W. V. DE RHE PHILIPPE,

Secretary.

Callender's Cable & Construction Co. Ltd., Cable.

Morris Industries Exports Limited, Chassis. G. Cohen, Sons & Co. Ltd., Cast iron machinery scrap.

Staveley Coal & Iron Co. Ltd., Cast and metal spun iron pipes.

Stanton Ironworks Co. Ltd., Cast iron pipes. Mirreles, Bickerton & Day Limited, Connecting rod bolts.

Eyre Smelting Co. Ltd., Copper and gun-metal.

British Insulated Cables Limited, Copper wire, copper conductor and cable.

Wolverhampton Corrugated Iron Co. Ltd., Corrugated iron.

Ruston & Hornsby Limited, Diesel-electric set.

J. Archdale & Co. Ltd., Drilling machine.

Kitchen & Wade Limited, Drilling machine. F. Town & Sons, Drilling machine.

Railway Share Market

Disappointment with the amended N.D.C. tax proposals resulted in reactionary conditions in most sections of the stock and share markets this week. Home railway stocks were firm and inclined to move in favour of holders. This partly reflects a more general realisation that the main line railways will not be affected by the new tax as their earnings do not bear a sufficiently large ratio to their capital. The chief factor to which attention is being drawn in the market is that the prospect of higher transport charges adds considerably to the scope for improved net receipts, even allowing for the possibility of higher wages and the larger costs which have to be met in numerous other directions. Traffic receipts again created a favourable impression, the total increase being £197,000 over the

corresponding calendar week of last year. For the two Whitsun holiday weeks receipts show a good increase over those for the equivalent holiday weeks of 1936.

Although the decrease of £15,000 in the past week's traffics of the Great Western was considered disappointing the ordinary stock has been in larger demand and is 63½ at the time of writing. Sentiment continued to be assisted by the favourable developments as regards the labour position in the coal trade. L.M.S.R. ordinary was also in demand around 34, partly because of this and partly because of last week's excellent traffic gain of £79,000. L.M.S.R. 4 per cent. preference at 87 and the 1923 preference at 79 were higher. L.N.E.R. second preference received more attention around 26½ following news of the

traffic gain of £53,000 and the preferred and deferred stocks were also reported to be more active. Southern deferred at 24 and the preferred at 92 were firm on the very good traffic gain of £80,000, but it is realised that in view of the pooling of receipts with the London Transport Board some of the benefit of this gain may be lost by the company. London Transport "C" stock was active at 87 on the latest developments in connection with the bus strike.

Foreign railway stocks were again dull and inactive, but B.A. Gt. Southern, Central Argentine and B.A. Western ordinary held up fairly well. B.A. Pacific and Argentine Great Western issues were unresponsive to the further payments announced in respect of debenture interest arrears. Cordoba Central debentures failed to keep best prices. Elsewhere, San Paulo was lower and Antofagasta remained out of favour, the tendency for buyers being to await more active general market conditions.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1936-37	Week Ending	Traffics for Week			No. of Weeks	Aggregate Traffics to Date			Shares or Stock	Prices					
			Total this year	Inc. or Dec. compared with 1936	This Year		Last Year	Increase or Decrease	Highest 1936		Lowest 1936	May 26, 1937	Yield % (See Note)			
South & Central America.	Antofagasta (Chili) & Bolivia	834	23.5.37	14,076	+	£ 1,210	21	354,550	£ 278,610	+	£ 75,940	Ord. Stk.	25	151½	21½	Nil
	Argentine North Eastern ..	753	22.5.37	10,589	+	900	47	412,107	372,192	+	39,915	A. Deb.	12	2	10	Nil
	Argentine Transandine ..	—	—	—	—	—	—	—	—	—	—	6 p.c. Deb.	54	45	85	411½
	Bolivar ..	174	Apr., 1937	6,000	—	1,150	17	23,200	26,900	—	3,700	Bonds.	9	5	8½	Nil
	Brazil ..	—	—	—	—	—	—	—	—	—	—	Ord. Stk.	16	11½	15½	3½
	Buenos Ayres & Pacific ..	2,806	22.5.37	113,648	+	22,931	47	4,498,492	4,004,035	+	494,457	Ord. Stk.	17½	6	12½	Nil
	Buenos Ayres Central ..	190	15.5.37	\$121,500	+	\$22,200	46	\$6,472,800	\$4,936,760	+	\$1,536,040	Mt. Deb.	31½	11	32½	Nil
	Buenos Ayres Gt. Southern ..	5,084	22.5.37	135,546	+	26,263	47	7,050,142	6,121,072	+	929,070	Ord. Stk.	31½	13½	30	Nil
	Buenos Ayres Western ..	1,930	22.5.37	48,263	+	1,906	47	2,357,026	2,144,503	+	212,523	"	29½	11	24½	Nil
	Central Argentine ..	3,700	22.5.37	150,803	+	39,128	47	7,222,607	5,552,735	+	1,669,87	"	32½	8½	29	Nil
	Do. ..	—	—	—	—	—	—	—	—	—	—	Dfd.	21	4½	11	Nil
	Cent. Uruguay of M. Video	273	15.5.37	11,569	+	749	46	573,210	513,322	+	59,888	Ord. Stk.	7½	3	5	Nil
	Do. Eastern Extn. ..	311	15.5.37	3,089	+	994	46	114,182	95,538	+	18,644	"	—	—	—	—
	Do. Northern Extn. ..	185	15.5.37	2,307	+	713	46	80,920	68,144	+	12,776	"	—	—	—	—
	Do. Western Extn. ..	211	15.5.37	659	—	113	46	45,336	40,514	+	5,022	"	—	—	—	—
	Cordoba Central ..	1,218	22.5.37	\$4,120	+	7,860	47	1,497,390	1,306,490	+	190,900	Ord. Inc.	5	1	5½	Nil
	Costa Rica ..	188	Mar., 1937	29,517	+	9,007	39	171,651	127,429	+	44,222	Stk.	36½	32	36	59½
	Dorado ..	70	Apr., 1937	14,400	+	800	17	62,400	52,100	+	10,300	1 Mt. Db.	107	101½	104½	5½
	Entre Rios ..	810	22.5.37	13,077	+	1,837	47	601,337	503,483	+	97,854	Ord. Stk.	17	6	13	Nil
	Great Western of Brazil ..	1,082	22.5.37	6,000	—	600	21	159,900	177,500	—	17,600	Ord. Sh.	12	5½	12	Nil
	International of Cl. Amer. ..	794	Mar., 1937	\$591,496	+	\$21,620	13	\$1,631,626	\$1,563,050	+	\$68,576	"	—	—	—	—
	Interoceanic of Mexico ..	—	—	—	—	—	—	—	—	—	—	1st Pref.	1	—	—	Nil
	La Guaira & Caracas ..	22½	Apr., 1937	6,205	+	1,790	17	23,080	17,375	+	5,705	Stk.	9	3	7½	Nil
	Leopoldina ..	1,918	22.5.37	22,249	+	7,028	21	454,002	349,297	+	104,705	Ord. Stk.	10½	3½	6	Nil
Mexican ..	483	21.5.37	\$344,500	+	\$37,000	20	\$6,310,000	\$5,337,500	+	\$972,500	"	11½	14	—	Nil	
Midland of Uruguay ..	319	Apr., 1937	8,764	+	1,152	43	87,446	72,500	+	14,946	"	11½	14	—	Nil	
Nitrate ..	397	15.5.37	6,394	+	2,010	19	70,975	58,029	+	12,946	Ord. Sh.	63½	41½	21½	Nil	
Paraguay Central ..	274	22.5.37	\$4,058,000	+	\$685,000	47	\$138,923,000	\$111,198,000	+	\$27,725,000	Pr. Li. Stk.	85	71	82½	7½	
Peruvian Corporation ..	1,059	Apr., 1937	97,082	+	13,685	43	927,889	786,623	+	41,266	Pref.	15	9	12	Nil	
Salvador ..	100	15.5.37	\$29,750	+	\$13,200	46	\$1,119,208	\$904,096	+	\$215,112	Pr. Li. Db.	18	16	22½	Nil	
San Paulo ..	153½	16.5.37	36,502	+	2,039	20	614,250	553,330	+	58,920	Ord. Stk.	86	46½	90½	5½	
Taita ..	164	Apr., 1937	2,800	—	55	43	34,610	35,495	—	885	Ord. Sh.	115½	14½	11½	8½	
United of Havana ..	1,353	22.5.37	27,903	—	2,786	47	1,292,038	1,123,401	+	168,637	Ord. Stk.	31½	1	3½	Nil	
Uruguay Northern ..	73	Apr., 1937	843	—	44	43	10,100	8,327	+	1,773	Deb. Stk.	5	3	9	Nil	
Canada.	Canadian National ..	23,566	14.5.37	764,696	+	41,619	19	13,964,834	12,480,842	+	1,483,991	—	—	—	—	—
	Canadian Northern ..	—	—	—	—	—	—	—	—	—	—	Perp. Dbs.	76	51	70	51½
	Grand Trunk ..	—	—	—	—	—	—	—	—	—	—	4 p.c. Gar.	104½	99½	98½	41½
India.	Canadian Pacific ..	17,228	21.5.37	525,400	+	7,000	20	10,321,600	9,541,200	+	780,400	Ord. Stk.	16½	10½	13	Nil
	Assam Bengal ..	1,329	30.4.37	39,090	+	641	4	110,302	103,924	+	6,378	Ord. Stk.	87½	82½	74½	4
	Barisi Light ..	202	30.4.37	3,780	+	45	4	13,342	11,655	+	1,687	Ord. Sh.	77½	65½	47	105½
	Bengal & North Western ..	2,107	30.4.37	93,411	+	2,675	4	274,156	264,890	+	9,266	Ord. Stk.	319	292½	304	51½
	Bengal Doors & Extension ..	161	10.5.37	3,161	—	110	6	12,877	12,745	+	132	"	127½	118	100½	5½
	Bengal-Nagpur ..	3,268	10.5.37	201,825	+	13,813	6	830,100	752,764	+	77,336	"	104	100½	91½	4½
	Bombay, Baroda & Cl. India ..	3,072	20.5.37	274,650	+	20,025	7	1,421,250	1,365,375	+	55,875	"	114	110½	112½	5½
	Madras & Southern Mahratta ..	3,229	30.4.37	174,375	+	4,720	4	510,450	516,140	—	5,690	"	116½	108½	107½	7½
	Rohilkund & Kumaon ..	572	30.4.37	18,711	+	114	4	58,101	58,928	—	827	"	311	286	304	51½
South India ..	2,532	30.4.37	119,792	+	4,041	4	350,660	351,311	—	651	"	107½	102½	101½	5½	
Various.	Beira-Umtali ..	204	Mar., 1937	85,489	+	19,434	26	418,485	382,261	+	36,224	—	—	—	—	—
	Bilbao River & Cantabrian ..	15	Mar., 1937	370	—	837	13	3,052	4,677	—	1,625	—	—	—	—	—
	Egyptian Delta ..	620	10.5.37	6,142	+	529	6	24,895	22,326	+	2,569	Pref. Sh.	21½	18½	11½	Nil
	Great Southern of Spain ..	—	—	—	—	—	—	—	—	—	—	Inc. Deb.	11½	13	3½	Nil
	Kenya & Uganda ..	1,825	Apr., 1937	266,245	+	21,428	17	1,117,191	992,425	+	124,766	B. Deb.	50½	37	45	7½
	Manila ..	—	—	—	—	—	—	—	—	—	—	Inc. Deb.	97	93½	96	4½
	Midland of W. Australia ..	277	Mar., 1937	13,408	+	493	39	119,598	124,864	—	5,266	—	—	—	—	—
	Nigerian ..	1,905	3.4.37	37,627	+	12,930	1	37,627	24,697	+	12,930	—	—	—	—	—
	Rhodesia ..	2,451	Mar., 1937	409,930	+	129,028	26	2,109,905	1,726,146	+	383,759	4 p.c. Db.	107	103½	107½	3½
	South Africa ..	13,263	1.5.37	630,073	+	34,261	5	2,806,203	2,620,958	+	185,245	—	—	—	—	—
	Victoria ..	4,728	Nov., 1936	868,988	+	45,953	21	3,995,540	3,959,297	+	36,243	—	—	—	—	—
Zafra & Huelva ..	112	Mar., 1937	14,819	+	5,299	13	44,012	30,750	+	13,262	—	—	—	—	—	

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1½.

† Receipts are calculated @ 1s. 8d. to the rupee. ‡ ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value.

Electric Railway Traction

Railway Electrification in France

THE opening of the Paris—Le Mans line of the French State Railways to electric traction marks the first stage in the progress of the Marquet plan for public works introduced in 1934, apart from improvements in stations and signalling on a relatively small scale. The main railway electrification schemes included in this work for creating employment were Paris—Le Mans (Etat); St. Pierre des Corps to Bordeaux (P.O.-Midi); and Paris suburban lines (Est), adding about 400 route miles to the electrified total. Including the 131 miles of the Paris—Le Mans line, the electrified route mileage of the five big French railways is approximately 1,885, all except 11 miles of which is d.c.; the d.c. mileage is split up between 650 volts (Paris suburban system, Etat, and a P.L.M. narrow-gauge line) and 1,500 volts for the remainder. The 11 miles mentioned above is the P.L.M. line from S. Dalmazzo di Terza to Piena, which forms part of the Italian main line from Turin to Ventimiglia, and was electrified at 3,700 volts, 3-phase a.c. by the Italian State Railways, with the permission of the P.L.M., to facilitate through locomotive working. A number of the secondary lines have electrified sections, and one of the most interesting of these is the St. Georges—La Mure—Corps line, south of Grenoble, which was electrified at 2,400 volts d.c. in the early years of this century.

Apart from the early suburban conversions at 600-650 volts d.c. on the Paris suburban lines of the Ouest and P.O. Railways, and on the narrow-gauge St. Gervais—Vallorcine route of the P.L.M., near Chamonix, electrification began in 1910 on the Midi Railway with 12 kV. 16⅔ cycles single-phase current, and about 70 miles were converted on this system. But subsequently d.c. at a tension of 1,500 volts was adopted and the single-phase routes were changed over. Later again, 1,500 volts d.c. was authorised by the French Government as the standard for all new construction. The Midi rapidly extended its electrified system until the majority of the lines in the foothills of the Pyrenees were operated electrically, including also the main line from Bordeaux to Irun, and during the present decade the long single-track heavily-graded line from Beziers to Neussargues was electrified. At first it formed an isolated electric section, but in 1934 was linked up with the remainder of the Midi electrified lines by the conversion of the Montauban—Toulouse—Narbonne—Sete route, which is again being extended by the electrification of the Narbonne—Port Bou line.

The main-line electrification of the P.O. grew out of the old Paris—Juvisy suburban system, and was opened from Paris to Vierzon at the end of 1936, the first section of 12 miles from Quai d'Orsay to Juvisy having been converted from low-tension d.c. with third rails to 1,500 volts d.c. with overhead conductors in 1924. The suburban system itself began with the inward extension of

the line from Austerlitz to Quai d'Orsay in 1900, for which section, mainly in tunnels, electric working was enforced; the extension of this first electrification from Austerlitz to Juvisy was carried out in 1904. The next main-line electrification was from Les Aubrais (the junction for the city of Orleans) to Tours, opened in 1934, and subsequently the electrification of the central France route was extended from Vierzon to Brive.

Electrification on the combined P.O.-Midi system has resulted in a saving of about 750,000 tons of coal a year, and on the P.L.M. and Etat systems (excluding the Paris—Le Mans line) in a saving of about 250,000 tons, representing a sum of about 175,000,000 fr. a year. Steam power stations supply the current in the Paris area, but the transmission network is tied-in to the networks of the hydro-electric stations in the Dordogne, which in turn have connections with the Midi's own hydro-electric stations in the Pyrenees. The P.L.M. electrification over the heavy grades of the Mont Cenis route from Culoz to Modane also is supplied with energy generated in hydro-electric stations. The narrow-gauge P.L.M. line from St. Gervais to Vallorcine has grades up to 9 per cent. Normally it used to be closed in the winter between Vallorcine and Le Planet, but beginning in 1935 an arrangement was made with the Swiss Martigny-Chatelard Railway (which joins it at the frontier) to work it during winter months.

It was partly because of the greater ease in supplying current from existing supply networks that the Paris—Le Mans line of the Etat was chosen for electrification before the Paris—Le Havre route, which is just as heavily trafficked. This electrification has been carried through very smoothly and punctually, but the extensive approach works between Versailles and Paris, undertaken coincidentally with the conversion in order permanently to improve the traffic working into and out of Montparnasse, have given some trouble, principally in the vicinity of Meudon, where the treacherous nature of the ground has led to the provision of immense retaining walls. It was in this neighbourhood that similar trouble was experienced at the beginning of the century when the new electric line from Invalides to Versailles (R.D.) was being built, and this line twice crosses under the Paris—Le Mans route. The Invalides line was at first supplied with four big compressed-air locomotives which were intended to supplement the electric trains and perform shunting and odd duties, but apart from working a service from St. Lazare round to Invalides during the period of the Paris Exhibition they appear to have done no work. The Paris—Le Mans electrification is an appropriate culmination to the great work of modernisation carried out by M. Dautry, the retiring General Manager of the French State Railways, who presided over the opening of the partial electric service on May 22.

FIRST MAIN-LINE ELECTRIFICATION ON FRENCH STATE RAILWAYS

The standard French 1,500-volt d.c. system has been used in the conversion of one of the principal lines leading from Paris

THE electrification of the main line of the French State Railways from Paris (Montparnasse) to Le Mans forms, with the exception of the Tours-Bordeaux conversion of the P.O.-Midi Railway, the greatest railway electrification included in the Marquet plan for public works. Stretching for 131 miles in a general west-south-westerly direction from the French capital, this double-track line forms the first part of the Etat route to Brittany and the Loire, and, as far as Chartres (55 miles) to Bordeaux. It belonged originally to the Chemin de fer de l'Ouest, which was absorbed in the Etat system in 1908.

A sum of 403,000,000 fr. was estimated as the cost of conversion, but coincident with the electrification, heavy civil engineering works have been undertaken between Versailles-Chantiers and Paris in order to improve the approach to Montparnasse terminus. These works, costing an additional 170,000,000 fr., included modifications to the present Montparnasse station, but not the new station which is to be built alongside the existing structure, and which will not be opened for some years.

Finance

The electrification of the Paris-Le Mans line received the approval of the Commission Nationale des Grands Travaux in 1934, and after the sanction of the Conseil de Réseau had been given, orders valued at 180,000,000 fr. were placed with electrical firms during the same year. Of the total cost of 403,000,000 fr., electrical equipment and overhead lines accounted for 228,000,000 fr. and locomotives and rolling stock for 175,000,000 fr. Under the conditions laid down by a ministerial decree of 1934, the money for the electrification and other works was obtained by a loan of 595,000,000 fr., the money to be advanced over successive periods from 1934 to 1940.

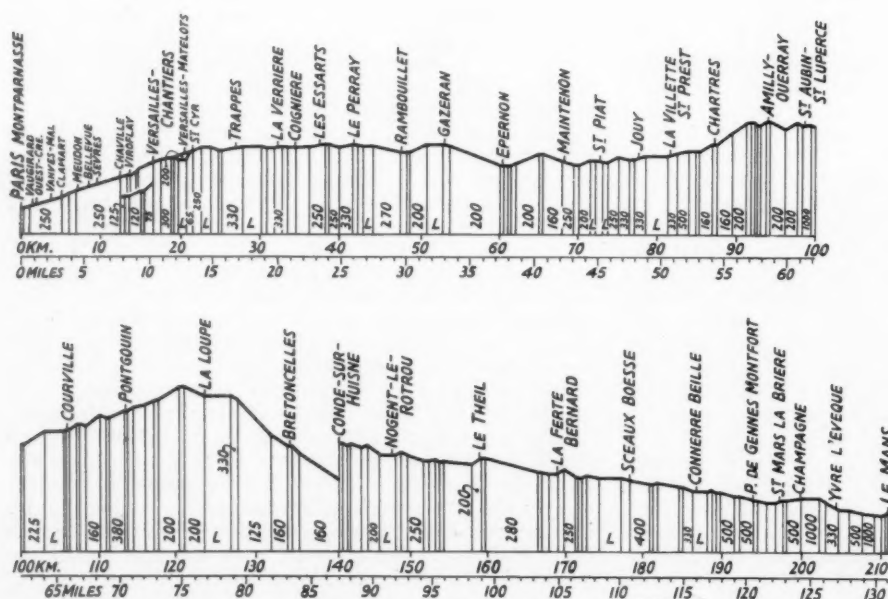
Based on the traffic and prices current in 1932, the first

estimates showed that, including all interest and capital charges, electric traction would cost 2,500,000 fr. a year more than steam traction. This assumed that interest and amortisation charges would be 6.75 per cent. and the cost of energy 0.24 fr. per kWh., and made no allowance for any increase in traffic or indirect advantages. But by 1934 the necessary allowance for interest and amortisation had been reduced to 5.35 per cent. and the cost of current had come down to 0.20 fr. per kWh., and this resulted in an estimated saving of 3,600,000 fr. a year, again without any allowance for increased traffic or indirect gains.

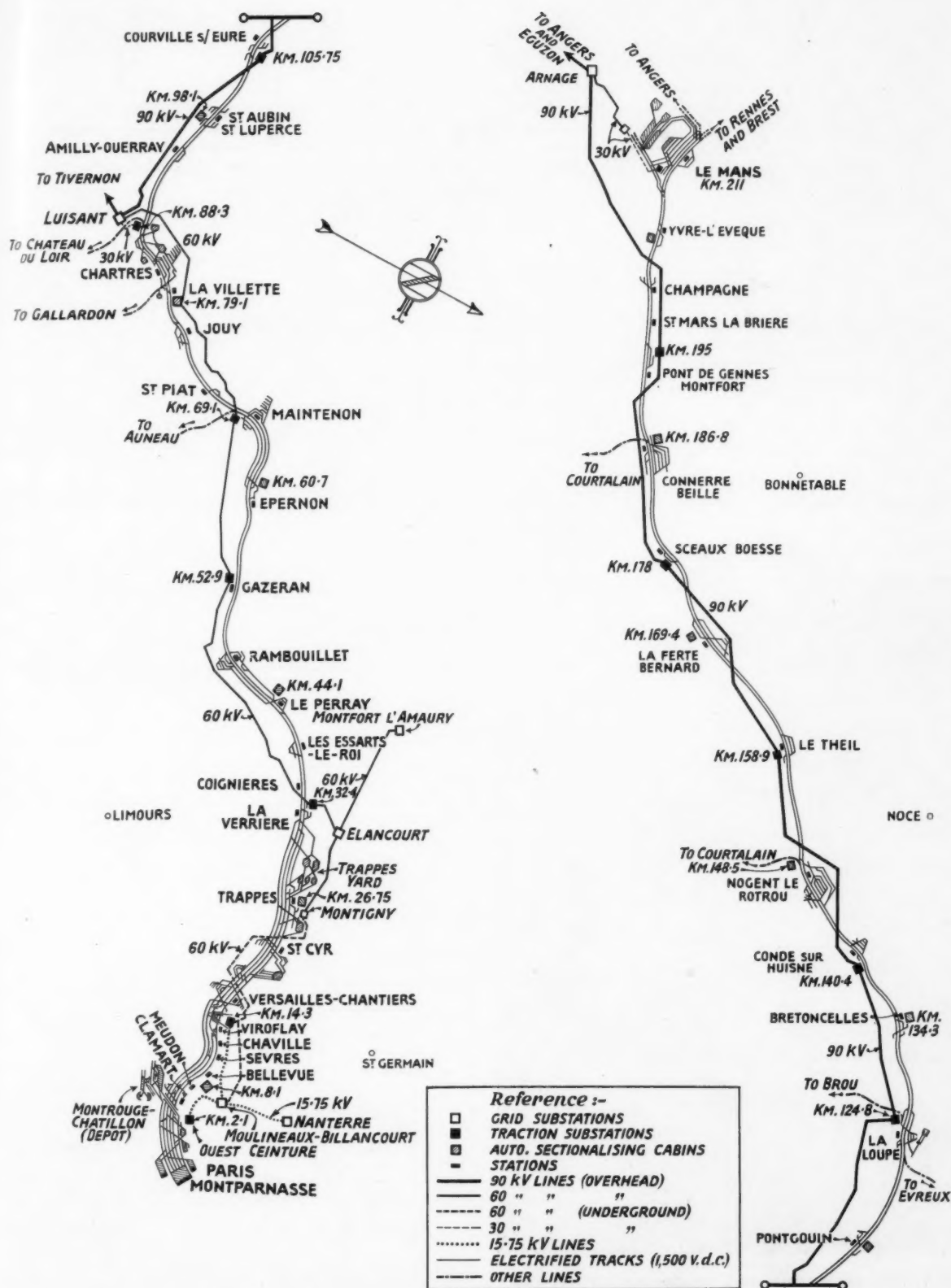
Automatic block signalling with colour light signals is being installed, but the cost of this is not included in any of the figures mentioned above, for it forms part of other Etat works under the Marquet plan, for which a sum of 26,000,000 fr. was estimated to cover the application of such signals to 485 km. (300 miles) of route.

Civil Engineering Works

Broadly speaking, the approach works near Montparnasse consisted of the quadrupling of the existing double line from Clamart (5 km. from Montparnasse) to Versailles-Chantiers (20 km. out). Four tracks were in existence between Versailles and La Verrière, and the quadruple line now extends unbroken from Montparnasse to La Verrière, 32 km. (20 miles). Flying junctions have been arranged to suit the passage of main line and local trains, and also to enable the main line trains to and from the Granville route to cross over to the correct side before the junction of the Granville and Le Mans line at St. Cyr. Also included in the approach works were the suppression of all level crossings between Montparnasse and Versailles-Chantiers, and the construction of another goods station (Vaugirard-Annexe) alongside the present Vaugirard yard, which would enable the goods station at the Champs de Mars to be used in connection with this year's Paris



Gradient profile of the French State Railways' main line from Paris to Le Mans, which carries the Brittany and St. Nazaire traffic, and also, between Paris and Chartres, the trains from Montparnasse to Bordeaux and La Rochelle



Map of Paris—Le Mans line, showing electrified tracks, transmission lines, substations and track-paralleling huts

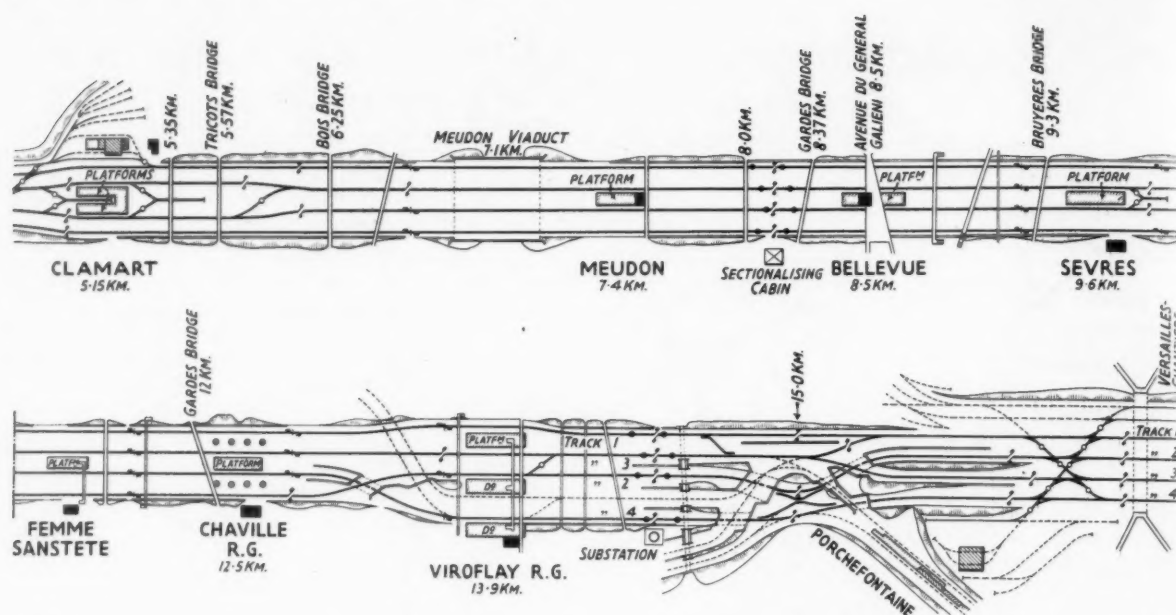


Diagram showing the present layout of tracks between Clamart, 5 km. from Montparnasse terminus, to the approach to Versailles-Chantiers station on the Paris—Le Mans line



A view of the reconstructed Meudon viaduct carrying the four-track main line over the Invalides—Versailles suburban route in the valley

Exhibition and subsequently to be closed. Other works included the provision at Versailles and elsewhere of sidings to stable suburban train sets during non-rush hours.

Out of Montparnasse the line rises all the way past Versailles as indicated in the accompanying gradient profile. Much of the line is on the side slope of a hill, the slippery nature of which has necessitated the erection of massive concrete retaining walls. The extent of the slipping has been much more than was expected, however, and has led to several modifications in the construction work and to some delay before the whole four tracks will be available for normal traffic. Embankments totalling 450,000 cu. m. (590,000 cu. yd.) have been built, and of the material for this only 170,000 cu. m. (215,000 cu. yd.) were supplied by material taken from cuttings.

One of the biggest works was the widening of the great seven-span masonry viaduct carrying the line over the valley at Meudon and spanning the Invalides-Versailles (Rive Gauche) electrified line, which, incidentally, is re-crossed again by the Le Mans line near Viroflay. This viaduct is 145 m. (475 ft.) long, and the seven main arches have a span of 11 m. (36 ft.) each. The maximum height over the road, which runs parallel to the Invalides line but at a lower level, is 36 m. (118 ft.). The widened deck of the viaduct to take four tracks was obtained by cantilevering beyond the piers, which were widened only to a limited extent. The width between the parapets is now 13.2 m. (43 ft. 6 in.), and the parapets themselves, into which are built the concrete masts for the overhead suspension, are 2.6 m. (8 ft. 6 in.) wide, and include a side-walk, as may be seen from one of the accompanying illustrations.

All the stations out to Versailles-Chantiers have been rebuilt completely, Viroflay having two island and one ordinary platform, and all the others one island platform. Versailles-Chantiers was completely reconstructed about six years ago. The standard length for the new island platforms is 150 m. (495 ft.) and the width 8 m. (26 ft. 6 in.).

At the other end of the line, the station at Le Mans has been laid out anew with six platform faces, and

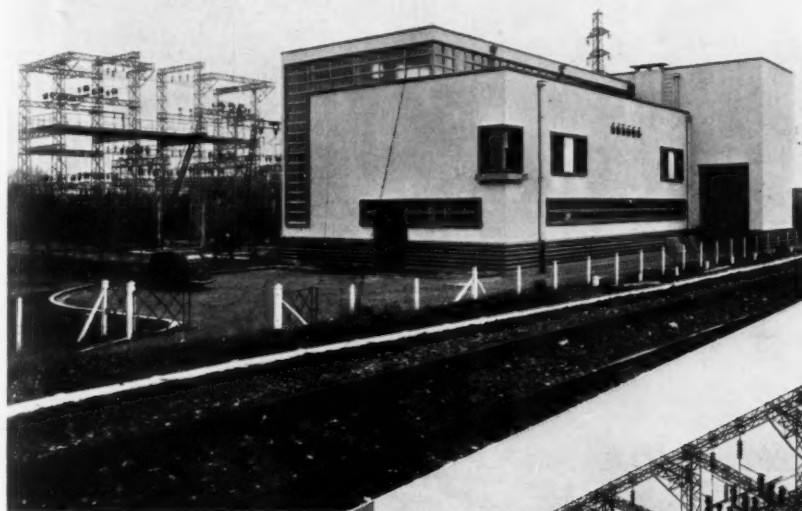
alterations and additions have been made to the depots and yards at Montrouge-Châtillon, Trappes, Rambouillet, Chartres and Le Mans. The layout of Chartres station was entirely remodelled in 1934.

Traffic

Both passenger and goods services are being worked electrically, and the passenger traffic is divided into four groups, viz. (a) inner suburban trains composed of ordinary multiple-unit trains and terminating at Versailles-Chartiers, Sevres, or Trappes; (b) fast trains to the outer suburban area, terminating at Rambouillet and composed of two-car streamlined sets made of stainless steel; (c)

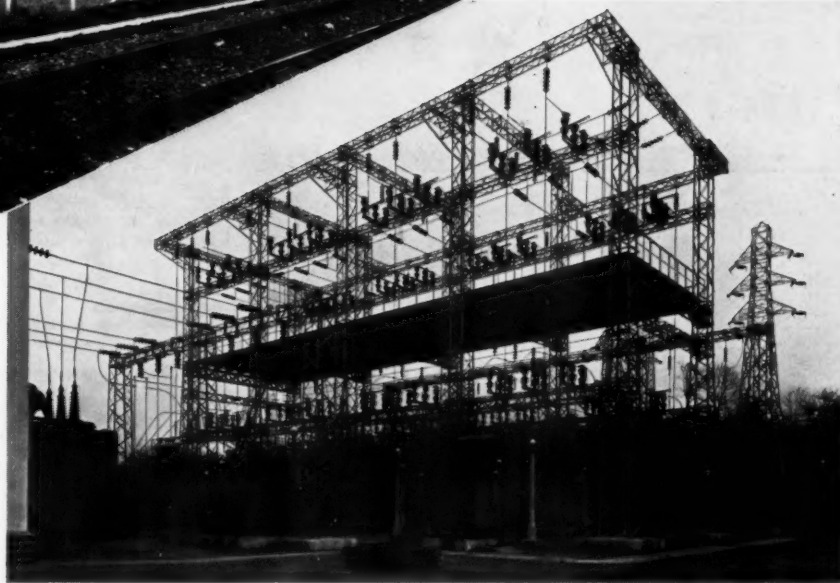
trains are hauled electrically to the junction where they are taken over by steam engines. At Viroflay connections are made between the suburban services on the main line and those of the Invalides-Versailles (R.G.) section, and this forms part of the scheme for a more general equalisation of the traffic among the Paris termini of the Etat.

While the electric system and rolling stock are being run in, the schedule of the express trains from Montparnasse to Le Mans is 135 min. non-stop, giving an average speed of 58.2 m.p.h., but beginning with the winter time-tables in October the non-stop timing is to be cut to 120 min., corresponding to an average speed of 65.5 m.p.h.,



Left: One of the new concrete substations supplying 1,500 volts d.c. to the Paris—Le Mans electrified line

Right: Incoming high-tension feeders and framework, with isolators and outdoor switchgear, behind one of the substations



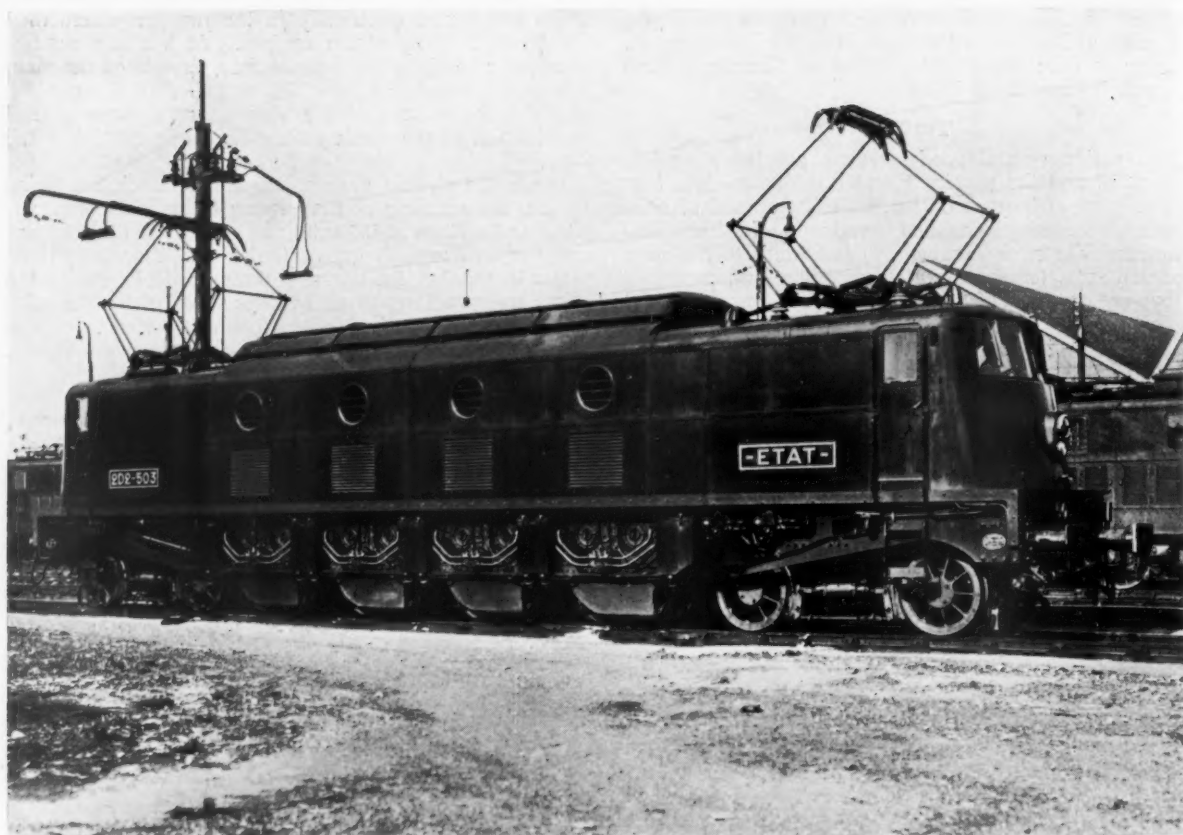
stopping trains between Chartres and Le Mans, connecting at both ends with main line expresses, and made up of one or more motor-coaches or a double-bogie locomotive hauling ordinary carriages; (d) express trains from Paris to Le Mans, some stopping at Chartres and others non-stop, made up of a 2-Do-2 electric locomotive hauling ordinary carriages. It is proposed to build some high-speed triple-car trains to make the Paris-Le Mans trip in under two hours.

At Le Mans, the main-line trains for Brittany and St. Nazaire are handed over to steam haulage, but main-line trains between Paris and Bordeaux and Paris and Granville also use the Le Mans line for part of its length. The Bordeaux trains are hauled electrically as far as Chartres, where they diverge. The Granville trains leave the Le Mans route at St. Cyr, only 21 km. (13 miles) from Montparnasse; nevertheless the principal passenger

a meritorious performance, especially in the up direction, where the grades are long. Train weights normally are 500 tonnes or less, but in summer the trailing loads rise to 700 tonnes. The yearly electric train mileage will be about 7,600,000 km. (4,760,000 miles), made up of 400,000 km. (260,000 miles) suburban, 4,800,000 km. (3,000,000 miles) passenger, and 2,400,000 km. (1,500,000 miles) freight.

Electrical Equipment

Electrification on the standard French 1,500-volt d.c. system has been applied to 211 km. (131 miles) of route and to 800 km. (497 miles) of track, the track mileage including about 22 km. (13.6 miles) at the Montrouge-Châtillon depot; 17 km. (10.6 miles) at Vaugirard; 30 km. (18.6 miles) in Trappes yard; and 40 km. (25 miles) in and around Le Mans station and yard. A good deal of expense has been saved and the convenience of future



Above : 2-D0-2 express locomotive with individual axle drive

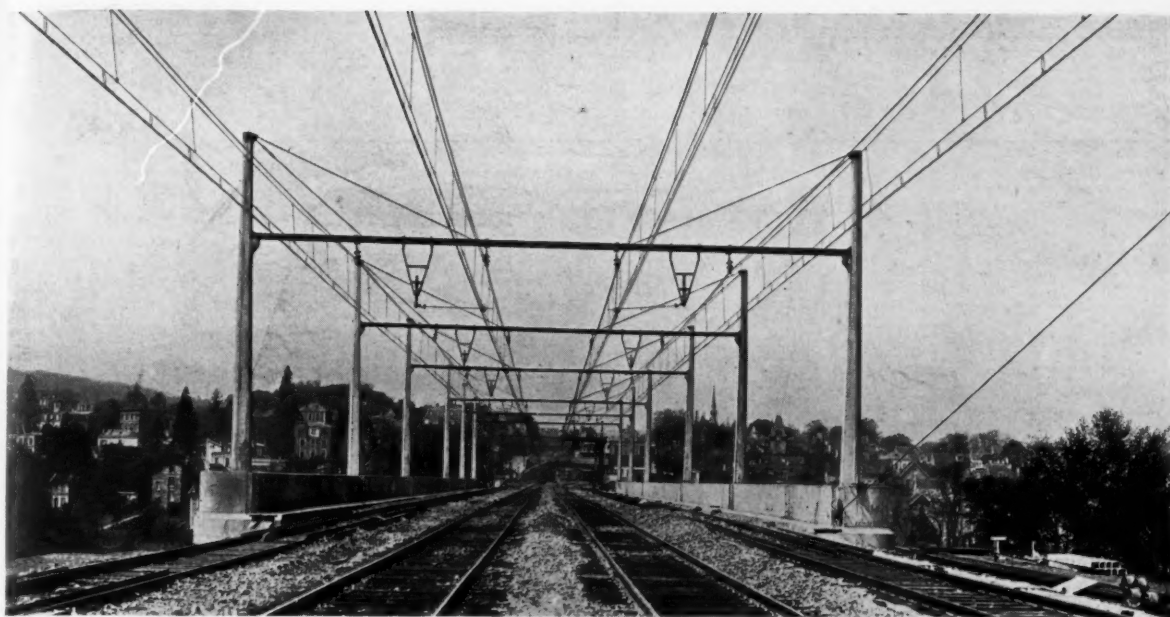


Left : Front view of express locomotive

Below : Driving controls as arranged at each end of the 4,000-h.p. locomotives

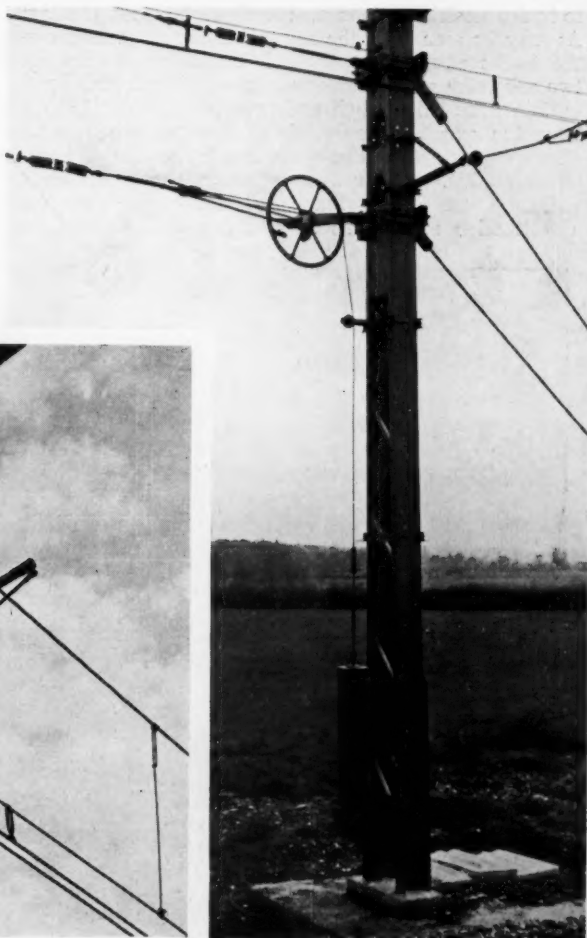


EXPRESS LOCOMOTIVE FOR THE MAIN-LINE ELECTRIFICATION OF THE ETAT

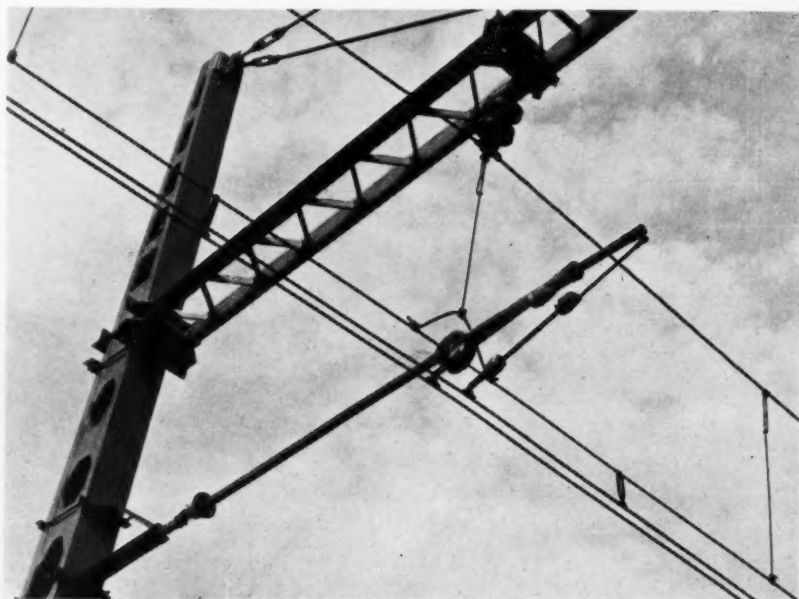


Above: Track and overhead construction, with concrete masts, on Meudon viaduct

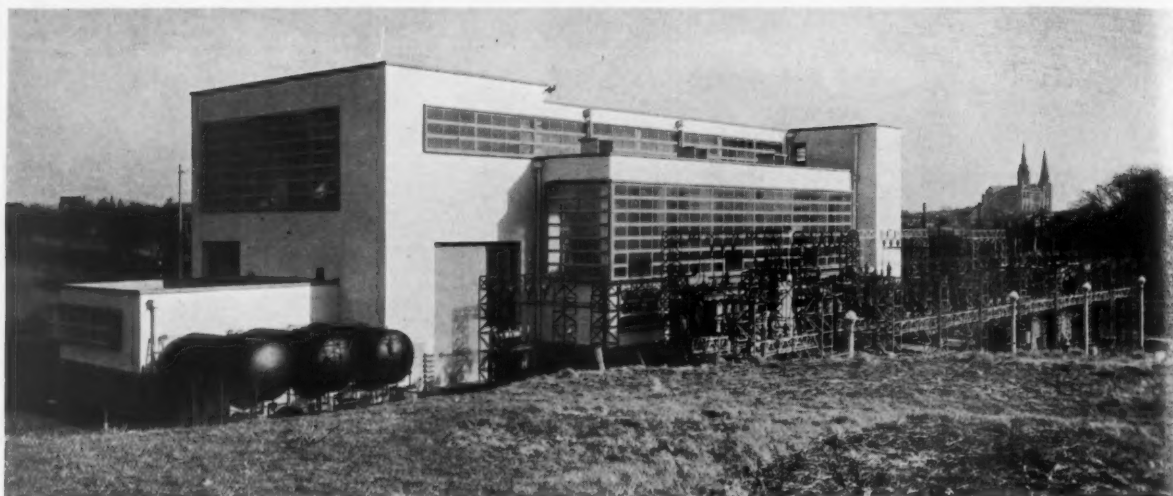
Right: One of the welded and riveted masts supporting the tensioning weights for the contact line



Below: Detail of the overhead suspension gear



CONTACT LINE SUSPENSION ON THE 1,500-VOLTS PARIS—LE MANS LINE



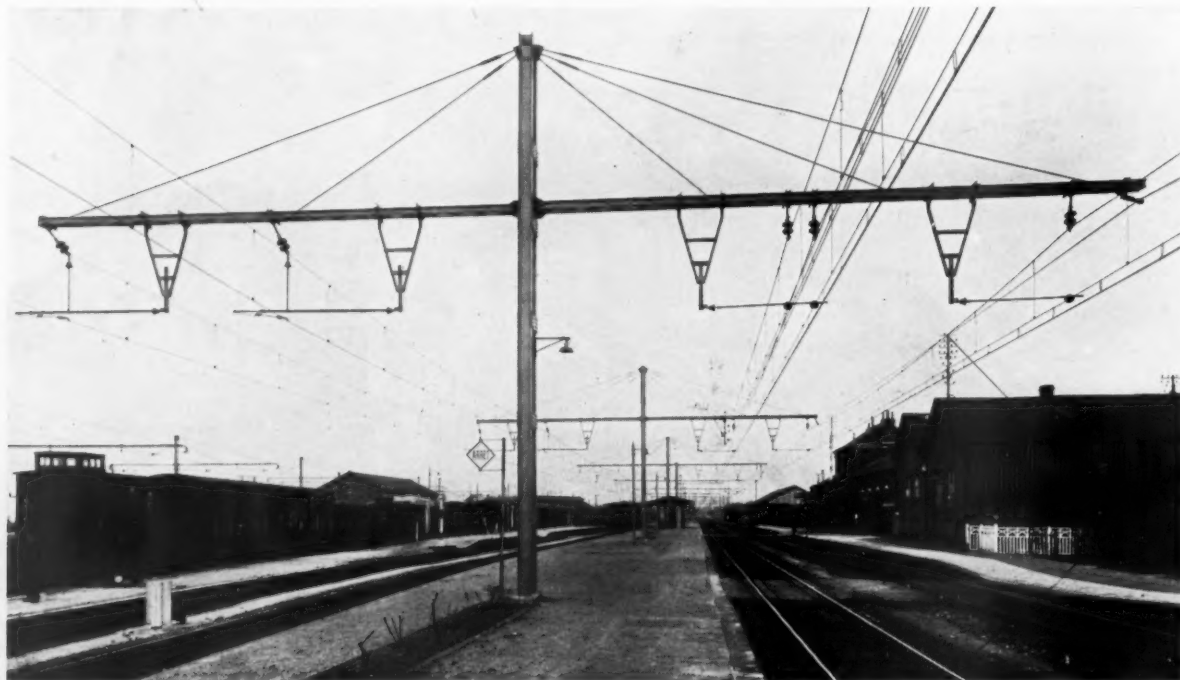
Chartres substation on the Paris—Le Mans line

working enhanced by following closely the practice of the P.O.-Midi Railway as regards overhead construction and locomotives.

Energy is obtained principally from a high-tension network tied both to steam power stations near Paris and to hydro-electric stations such as Eguzon, in the Dordogne. As may be seen from the accompanying diagram showing the tracks electrified and the h.t. transmission lines, the two substations nearest Paris (Ouest-Ceinture and Porchefontaine) are fed through underground cables at 15.75 kV. from the existing supply of the Etat suburban system. The remaining substations are fed by overhead lines at 90 or 60 kV. through two grid substations, the first at Luisant, near Chartres, and at Arnage, near Le Mans. The traction substations at Chartres and Le Mans are

fed direct from the adjacent grid substations by underground cables, for, being situated in towns, the usual arrangement of pylons could not be adopted. From the grid substation at Montigny, near Trappes, the 60 kV. line is carried underground to the existing supply substation at Moulineaux-Billancourt in the suburban area.

Apart from the changes in the transforming equipment due to the different voltages of the h.t. supplies, the design and layout of the 13 substations is the same, although, of course, they are not all of the same capacity. All have rectifier sets, the two nearest Paris having a rated capacity of 1,750 kW. per set; and the remainder 2,000 kW. per set. Ouest-Ceinture and Porchefontaine have three 2,750 kW. Electro-Mécanique rectifiers each, and the others two Als-Thom 2,000 kW. rectifiers each. At the



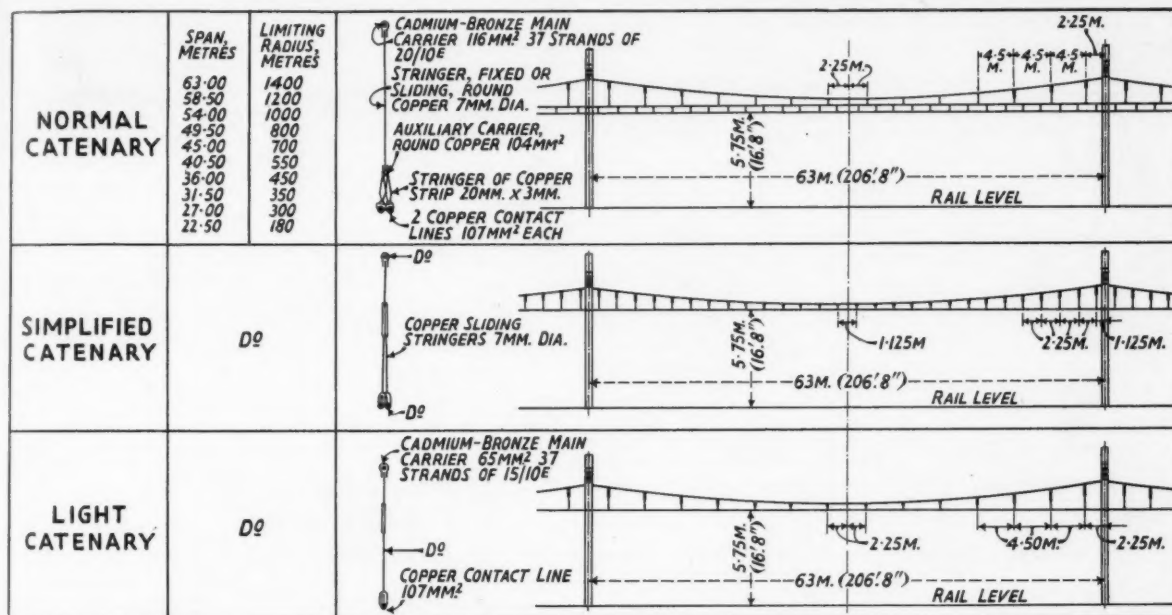
One of the types of overhead suspension as used in the stations

moment all the substations are controlled manually, but remote-control apparatus is being installed and eventually the whole line will be controlled from Paris. The incorporation of rectifier sets instead of rotary converter sets as used on the Paris-Brive line of the P.O.-Midi Railway is due mainly to the decision not to use regenerative braking. Outside of the suburban area the distance between substations varies from 15.5 to 20.5 km. (9.6 to 12.7 miles).

The high-tension supply is led in through an elaborate series of high-speed breakers and isolators arranged against the steel framework carrying the insulators, earthing wires and lightning conductors, and passed to 2,000 kVA. three-phase oil-cooled transformers located outdoors on movable trolleys to facilitate erection and removal. The trans-

and a double contact wire per track. The masts are of steel bars and sections, partly riveted and partly welded, and are mounted in concrete blocks cast in position. On certain sections the masts are arranged only on the inner side of the line and have a long cantilever arm carrying the suspension system for both tracks; in certain stations with island platforms there is a row of single central masts with a long cross arm, each side of the arm carrying the wire for two tracks. In the larger stations, depots, and yards, cross-catenary systems are used, and at certain points on the double track open line, e.g., at the track sectionalising huts and substations a heavy cross-girder structure has been erected.

The three suspension systems used on normal open line sections are shown in the accompanying illustration, and



The three main types of catenary suspension systems used on open line and sidings on the Paris—Le Mans electrification of the French State Railways

formers supply double three-phase current at a tension of about 1,650 volts to the rectifiers. These are of the steel tank type and have a continuous rating at 1,650 volts of 1,215 amp. (2,000 kW.). The overload capacities are 1,820 amp. for two hours and 3,650 amp. for 5 min., and the voltage regulation and protection against faults are covered by grid control. In all the substations one rectifier set is used as a standby.

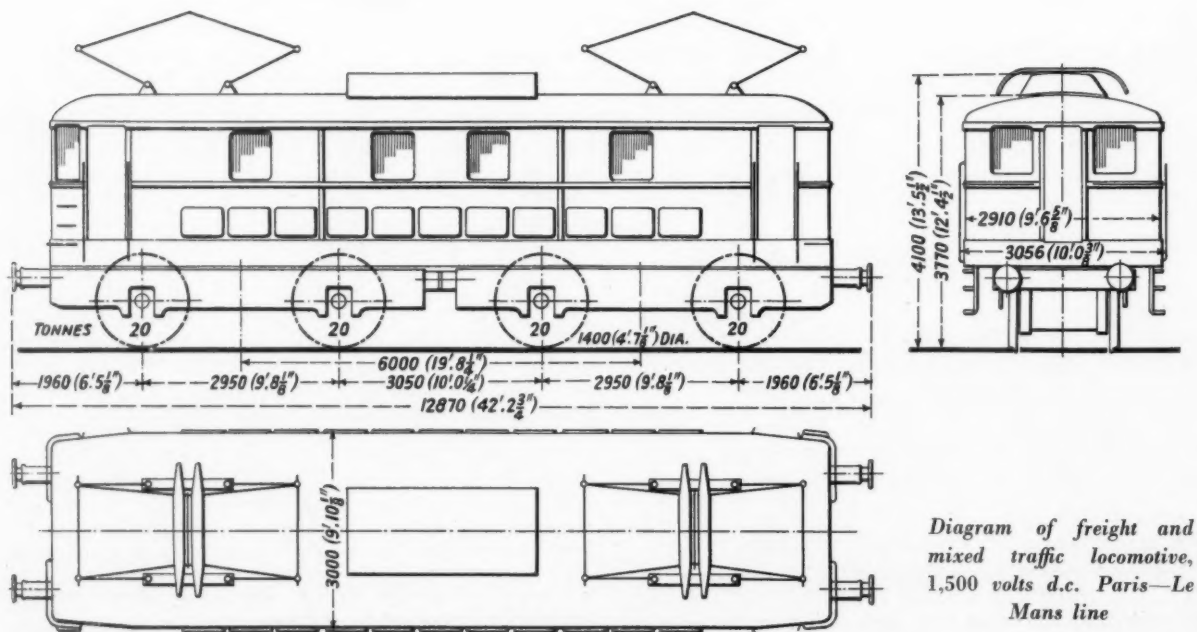
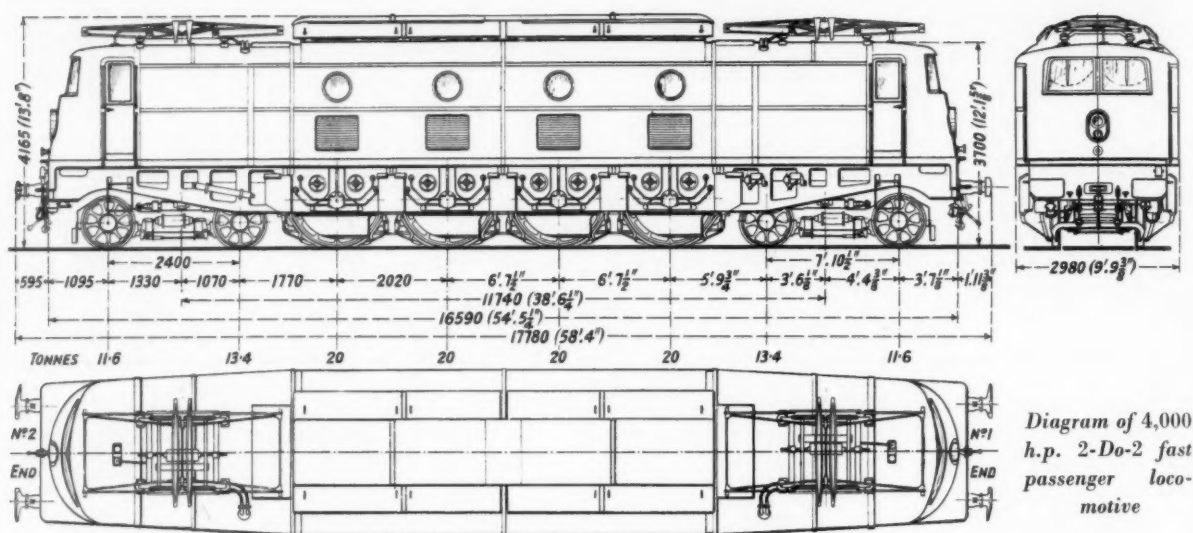
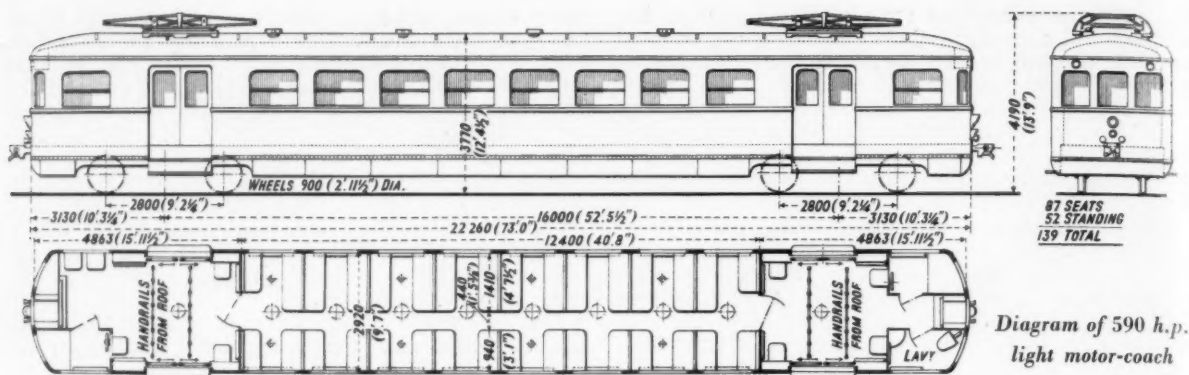
All the new substations are constructed of concrete and are of modern two-storey design with ample window and floor area, and space sufficient for the installation of a third rectifier group should this be necessary in future. Arrangements have been made for the stationmaster at the nearest station to cut out the adjacent section of line should any accident or other occurrence render this an emergency measure, but of course this provision will not come into operation until the remote control is functioning. Between each pair of substations is a brick and concrete sectionalising cabin for splitting up the normal electrical sections.

Overhead Line

The contact wire suspension system is generally on the P.O.-Midi design with separate masts and cantilever arms for each track on open line, and with two carrier wires

the characteristics of each are given alongside. In the normal and light catenary systems there is a main carrier of cadmium-bronze with a cross-sectional area of 116 sq. mm. (0.18 sq. in.) and made up of 37 strands giving a cable diameter of 14 mm.; an auxiliary carrier of hard-drawn copper with an area of 104 sq. mm. (0.161 sq. in.) and a diameter of 11.5 mm.; and a double contact wire of copper, each wire having an area of 107 sq. mm. (0.166 sq. in.) and a diameter of 12.24 mm. (0.482 in.). The light catenary system has only one bronze carrier of 37 strands and one copper contact wire with an aggregate area of 172 sq. mm. (0.266 sq. in.) compared with an aggregate of 434 sq. mm. (0.67 sq. in.) of the normal system. Over certain parts of the route a 37-strand feeder cable of 21 mm. (0.83 in.) dia. and with an area of 262 sq. mm. (0.405 sq. in.) is carried between the mast arms; it is of solid drawn copper. The stringers are of copper, and have a diameter of 7 mm. (0.275 in.) in all three types of construction.

The tension of the various members of the overhead system is maintained by weights located about every 1.2 km. (1,300 yd.) The main carrier is maintained at a tension of 2,338 kg. (5,150 lb.); the auxiliary carrier at 1,250 kg. (2,750 lb.); and the contact wires at 1,700 kg. (3,750 lb.). The weight of the complete suspension system



per running metre averages 4.2 kg. (2.82 lb. per ft.). The contact wires and carriers are staggered transversely in the usual manner to obviate ridge-wear of the pantograph strips, and are set at a normal height of 5.75 m. (18 ft. 11 in.) above rail level; the minimum height is 4.6 m. (15 ft. 1 in.) and the maximum, at level crossings, 6.0 m. (19 ft. 9 in.).

The return current is carried in the running rails, which are bonded together by two copper strands fixed in the web of the rails by a tapered cup and riveted head. The return circuits of the two tracks are paralleled at intervals on the open line. As a.c. track circuiting is used, impedance bonds are placed between the rails at the end of each signalling section.

Motive Power

The 23 express locomotives of the 2-Do-2 type have been built by the Cie Electro-Mécanique, as main contractors, and the mechanical portion by the Cie Fives-Lille; they have a maximum output of 4,200 h.p. at the wheel rims. At 25 per cent. adhesion the tractive effort is 20,000 kg.

Als-Thom to the same general design as the P.O.-Midi locomotives, and the second of a batch of Bo-Bo locomotives rebuilt at the Batignoles works of the Etat from old locomotives from the 650-volt third-rail suburban system. These rebuilds retain the third-rail collecting shoes but are fitted with one pantograph, and are able to work on both the 1,500-volt or 650-volt systems.

With an hourly rating of 1,940 h.p. at 49 km.p.h. (30.5 m.p.h.) the 35 Als-Thom locomotives are amongst the most powerful Bo-Bo locomotives in the world; at this one-hour rating the tractive effort at the wheel rims is 10,800 kg. (23,800 lb.). The continuous rating is 1,630 h.p. and the top speed 95 km.p.h. (59 m.p.h.). The maximum tractive effort with the axle loads adjusted to counteract the weight alterations brought about by the motor torque reaction and the drawbar reaction is 24,800 kg. (54,800 lb.), giving a factor of adhesion of 3.2 against the locomotive weight of 79.5 tonnes. The electrical equipment weighs 31.8 tonnes and the mechanical portion 46.5 tonnes.

The five light motor-coaches for the Chartres-Le Mans and other services have steel framework and aluminium

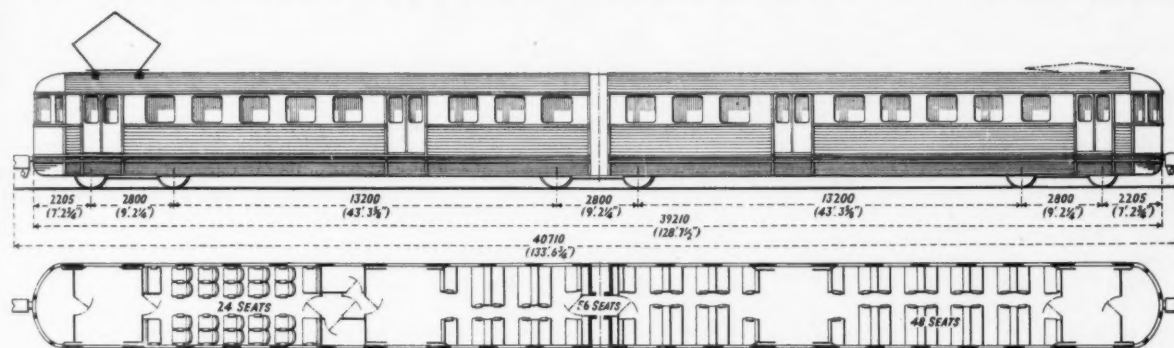


Diagram of 1,080 h.p. stainless-steel motor-coach set for fast outer suburban trains between Paris and Rambouillet

(44,000 lb.). On the one-hour rating at a line voltage of 1,500 and full field in the motors the tractive effort at the wheel rims is 14,300 kg. at 69.5 km.p.h. (31,500 lb. at 43 m.p.h.), corresponding to 3,610 h.p. The maximum speed is 150 km.p.h. (93 m.p.h.), but in normal service the limit is 130 km.p.h. (81 m.p.h.).

In general design these locomotives are the same as the non-regenerative locomotives of the same wheel arrangement belonging to the P.O.-Midi Railway, but the ends of the bodies have a sloping rounded contour instead of a square end. The weight of 130 tonnes is made up of 56 tonnes electrical equipment, 72.5 tonnes mechanical portion, and 1.5 tonnes of sand, tools, supplies and crew. Each of the four motors is fully sprung and has two armatures wound for 750 volts and arranged permanently in series; they drive the 1,750-mm. (69-in.) wheels through the Büchli (Brown-Boveri) individual axle drive. The pantographs have two pans with carbon wearing strips. The carrying bogies at each end of the locomotive have spring-controlled side play, and the pivots are not arranged in the centre of the wheelbase but towards the inside axle, giving a differential weight distribution, greater guiding properties, and a gradual introduction of the weight of the locomotive on to the rails. The Westinghouse type of air brake is incorporated and applies two blocks on each driving wheel and one on each bogie wheel.

The locomotives for freight traffic and stopping trains are of the double-bogie four-motor type in two groups, the first consisting of 35 new Bo-Bo locomotives built by

panel plates. They have two nose-suspended motors with a total one-hour output of 590 h.p. and are allowed a top speed of 80 km.p.h. (50 m.p.h.). The seating capacity is 87 including the rush-hour *strapontins*, and there is room for 52 passengers standing. Standard buffing and draw-gear is not fitted and any necessary increase in capacity is provided by coupling two of these motor-coaches in multiple-unit through centre couplers. From the diagram reproduced on the opposite page it will be noticed that a good deal of the standing room is provided in the luggage compartment, and grab rails are dropped from the roof.

Stainless steel built up on the Budd Shotweld process has been used in the construction of the 20 fast two-car sets for the Paris-Rambouillet services, built by the Etablissements Carel Fouché, the Budd licensees for France. These two-car sets are articulated and are carried on three bogies. The four motors are of the nose-suspended type with an installed capacity of 1,080 h.p. on the continuous rating, and through the action of a special 42-notch controller operated by a 1,500-volt motor brought into action intermittently, an acceleration of one metre (3.28 ft.) per sec. per sec. is possible without discomfort. Multiple-unit control is fitted, and it is the intention to run up to four of these rakes together under the control of one man, giving a train with a seating capacity of 512 in three classes. The top speed of these trains is 130 km.p.h. (81 m.p.h.) in normal service, but it is probable that on trial runs appreciably greater speeds will be attained.

Magnus Volk

ELECTRIC traction has for so long been a part of our daily life that the passing of a pioneer reminds us forcibly that the practical history of electric traction is spanned by the life of one man. When Magnus Volk, whose sudden death occurred at Brighton last week, was born in the same town in 1851, the tractive force of electricity was envisaged only in the form of the experimental battery vehicle.

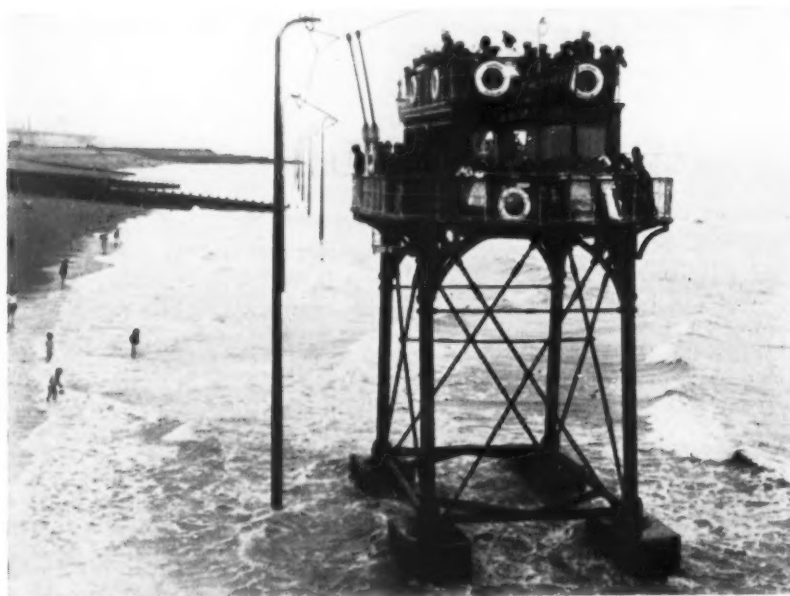
The first electric railway in the world was a 900-yd. exhibition line laid in Berlin in 1879 by Dr. Werner von Siemens, and the first public line was opened in May, 1881, at Lichterfelde, a suburb of Berlin. Progress during the next two years was not rapid, and when in 1883 Volk proposed to build an electric line on the beach at Brighton, he was in the true sense a pioneer. He had already obtained a gold medal in 1881 for a street fire-alarm system similar to that still in use, and in the following year he had introduced the telephone to Brighton. He then became Electrical Engineer to the Brighton Corporation, and in April, 1883, lighted the whole of the Brighton Pavilion, an installation which was then the largest in the country. It was at this time that he secured the consent of the Corporation to lay an electric railway along the beach from a point opposite the entrance of the old Aquarium to the Chain Pier. This was opened on August 3, 1883, and was the first in Great Britain. When the jubilee was celebrated, nearly four years ago, the many telegrams of congratulation included a graceful tribute to Mr. Volk from Colonel Gilbert S. Szlumper, Assistant General Manager of the Southern Railway, which read "your pioneer electric service set example which we have seized upon." This original line was worked for about six months, during which some 30,000 persons were



The opening ceremony on August 3, 1883

carried. At first the running rails (spiked to longitudinal tar-coated wooden sleepers) were used as conductors, and the car had wooden wheels with steel tyres; we believe that the original gauge was 2 ft. In the early months of 1884 the line was reconstructed and extended under the Chain Pier to Paston Place, and was reopened on April 4. The present gauge of 2 ft. 8½ in. was then adopted, and a third-rail conductor installed. Financially it proved a great success from the beginning, and nearly 30,000,000 passengers have been carried to date.

Probably Volk's most ambitious traction project was a scheme sanctioned by Parliament in 1893 under the formidable title of The Brighton and Rottingdean Seashore Electric Tram-road Company, which materialised under the popular appellation of "Daddy Long-Legs." This was a 40-ton saloon car, 50 ft. by 22 ft., which accommodated 150 passengers on a deck supported 24 ft. above rails on four steel legs. The feet enclosed four 30-in. wheels, so that the car ran on sixteen wheels. The track consisted of two pairs of 2 ft. 8½ in. gauge lines laid so that the extreme rails were 18 ft. apart. Power was conveyed by an overhead trolley-wire to four 25-h.p. electric motors on deck, and was transmitted thence by shafts inside the legs. This line was opened in November, 1896; badly damaged by the great gale of December of that year, which swept away the famous old Chain Pier; resumed work in August, 1897; and was removed in 1901 to allow for groyne lengthening by Brighton Corporation. An extension to Black Rock of the original Volk line was made in part substitution, and opened on February 21, 1901.—C. E. L.



Volk "oversea" railway from Brighton to Rottingdean. It was opened in November, 1896, and dismantled in 1901